

TREK

TELEMETRY PROCESSING

USER GUIDE



November 2012

Approved for Public Release; Distribution is Unlimited.

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1 What You Need To Know Before You Read This Document

Before reading this document you should be familiar with the material in the TReK Getting Started Guide (TREK-USER-001) and the TReK Telemetry Tutorial (TREK-USER-002). If you have not read these documents, you may have difficulty with some of the terminology and concepts presented in this document.

It is also recommended that you work through the Telemetry Processing Tutorial (TREK-USER-017) before reading this document. The Telemetry Processing Tutorial provides a step-by-step guide to the main features in the Telemetry Processing application. In contrast, this document provides details about each menu, dialog box, and message.

We assume you are an experienced Windows user. Information about how to use a mouse or how to use Windows is not addressed in this user guide. Please see your Windows documentation for help with Windows.

2 Technical Support

If you are having trouble installing the TReK software or using any of the TReK software applications, please try the following suggestions:

Read the appropriate material in the manual and/or on-line help.

Ensure that you are correctly following all instructions.

Checkout the TReK Web site at <http://trek.msfc.nasa.gov/> for Frequently Asked Questions.

If you are still unable to resolve your difficulty, please contact us for technical assistance:

TReK Help Desk E-Mail, Phone & Fax:

E-Mail:	trek.help@nasa.gov
Telephone:	256-544-3521 (8:00 a.m. - 4:30 p.m. Central Time)
Fax:	256-544-9353

TReK Help Desk hours are 8:00 a.m. – 4:30 p.m. Central Time Monday through Friday. If you call the TReK Help Desk and you get a recording please leave a message and someone will return your call. E-mail is the preferred contact method for help. The e-mail message is automatically forwarded to the TReK developers and helps cut the response time.

3 Introduction

The TReK Telemetry Processing application provides the capability to monitor and control all telemetry processing activity on your TReK system. As discussed in the TReK Telemetry Tutorial, a TReK system can receive telemetry data from multiple sources. Although multiple types of telemetry packets from multiple sources may be arriving at your TReK system, it's up to you to decide whether to accept those telemetry packets or let them drop. The Telemetry Processing application is used to identify which telemetry packets should be accepted by your TReK system and what to do with the packets when they arrive. You can make these decisions in real time and you can change your configuration at any time. You may be wondering why you would ever let packets drop. This type of scenario may occur when you are not interested in the data in a particular stream at a particular time, or when you are in a situation when it is important to reserve precious resources (such as CPU power and memory.)

Once you have decided to accept a particular telemetry packet (see the TReK Telemetry Tutorial for information about uniquely identifying a telemetry packet) there are several things you can do with the packet. You can choose to process the packet (there are several different types of processing options available) or pass the packet through. If you process the packet, you can retrieve the individual parameters in the packet using the TReK API. If you use the Pass-Thru capability, you will be able to retrieve the raw contents of the packet using the API, but not the individual parameters that make up the packet. Regardless of whether you process the packet or use the Pass-Thru capability, you also have the option of recording and/or forwarding the packet. If you record the packet, you can also use the Telemetry Processing application to play the packet back (i.e., send it back through your TReK system). This is called a local TReK playback. When you play the packet back, you will again have the option of processing, passing-thru, recording, or forwarding the packet. If you specify that a packet should be forwarded, the incoming packets will be routed to the machines you specify as they arrive. You can forward multiple packets to multiple machines all at the same time.

Other features in the Telemetry Processing application include the ability to modify processing attributes such as calibration, sensing, switching, and monitoring. You can also automatically generate a display to view any data that you are processing (real-time data or playback data). There are also capabilities to set telemetry processing options and view telemetry processing status information.

4 Telemetry Processing Main Window

The Telemetry Processing main window consists of two main areas as shown in Figure 1. The top part of the main window contains the list of packets that your TReK system should accept and identifies what will be done with the packets when they arrive. When you start the Telemetry Processing application the list will be empty. This is because you have not yet added any packets to the list. The bottom part of the window is a message area that is used to display important status and error information messages about the telemetry processing activities in progress.

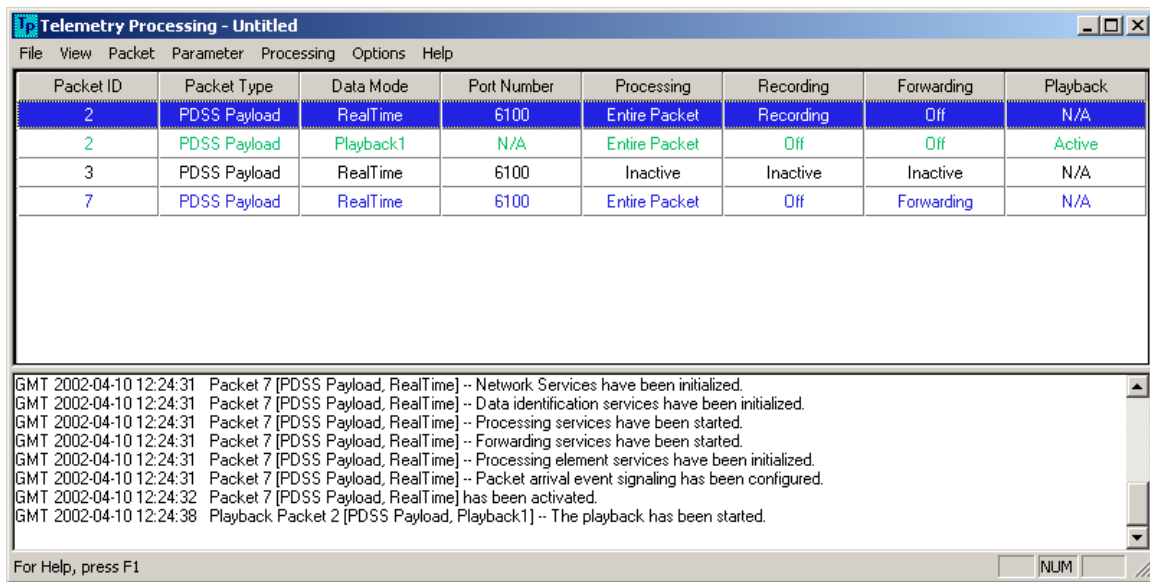


Figure 1 Telemetry Processing Main Window

There are eight pieces of information that are displayed for each packet in the packet list. They are Packet ID, Packet Type, Data Mode, Port Number, Processing, Recording, Forwarding, and Playback. The Packet ID, Packet Type, and Data Mode are used together to uniquely identify the packet. The Processing, Recording, Forwarding and Playback columns identify the status of each of those activities. The Playback information is only applicable to local TReK playback packets.

In Figure 1 the first packet in the list is packet 2 which is a PDSS Payload RealTime packet. This packet has been activated meaning that the TReK system is actively accepting this packet. This packet has been set up so it will be processed and recorded. This is indicated by the status information in the Processing and Recording columns. The second packet in the list is a playback packet. This is indicated by the Active status shown in the Playback column. This packet has been set up to be processed but not recorded. This is why the Recording column indicates that recording is Off. It is possible to turn recording on even if this option was not selected when the packet was originally added. The third packet in the list is packet 3 which is a PDSS Payload RealTime packet. This packet has not been activated yet. This is indicated by the Inactive status shown in the Processing, Recording, and Forwarding columns. The fourth packet in the list is packet 7 which is a PDSS Payload RealTime packet. This packet has been set up so it will be processed and forwarded but not recorded. All the packets in the packet list are controlled using the Packet menu. There are also additional options on the File menu that provide a way to save a packet list configuration.

If you are running the Telemetry Processing application or viewing this document from within Microsoft Word then you have probably noticed that each packet row has a color associated with it. The color provides information about the packet. For example, when using the default colors, if the packet row is black, this indicates that the packet has not

been activated. If the packet row is purple, this indicates that the packet is initializing. If the packet row is blue, this indicates that the packet is activated but that no data has arrived. If the packet row is green, this indicates that data packets are arriving. The colors are helpful in providing immediate information about the general configuration and processing status of each packet in the list.

In addition to the main window view shown above (packet list view), there is another view called the snapshot view. The View menu provides a way to switch between the packet list view and the snapshot view. The snapshot view is shown below in Figure 2. In snapshot view, information about each packet is shown in a single cell vs. an entire row. This view can be helpful when there are a large number of packets in the packet list since it provides a way to see the status of a large number of packets without scrolling. Please note that the snapshot view only provides a way to view status information and does not provide a way to change a packet's configuration. For example, you cannot select a packet and then change its configuration while in this view.

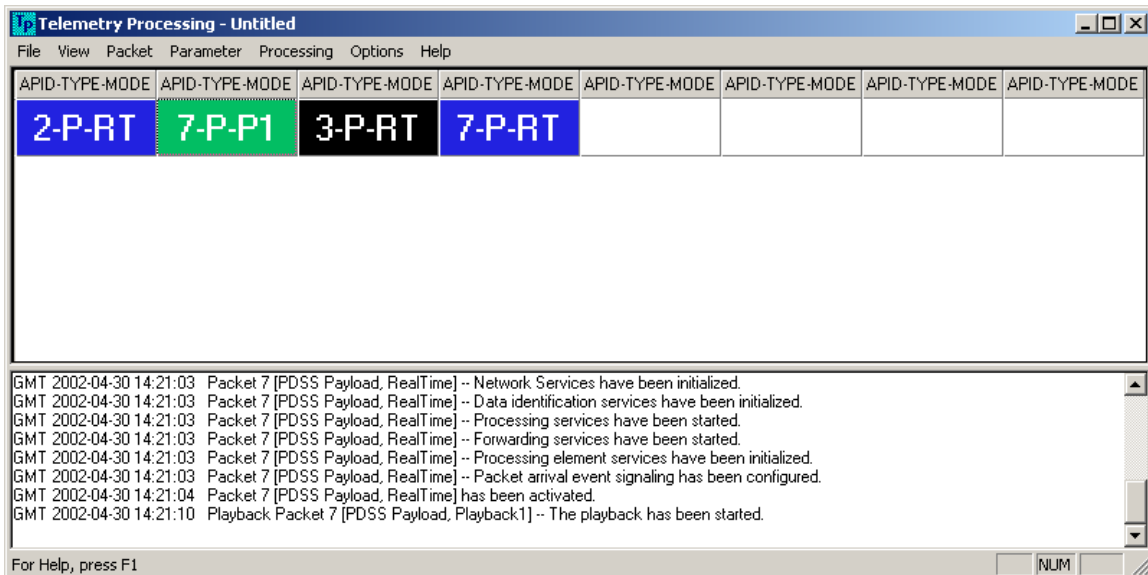


Figure 2 Main Window Snapshot View

5 Telemetry Processing Menus

The Telemetry Processing application contains seven main menus: File, View, Packet, Parameter, Processing, Options, and Help. Each of these menus is described in more detail below.

5.1 File Menu

The File menu is used to create, open, and save telemetry processing configurations and to exit the Telemetry Processing application. A Telemetry Processing configuration is comprised of the packets in the packet list along with all the information associated with each packet. For example, suppose you have 3 packets in the packet list and all three are configured to be processed, one is to be recorded, and one is to be forwarded. If you save the configuration, all of this information will be saved in a file. This includes all the database information (such as calibrators, sensors, etc.) associated with each packet as well as other information about the packet such as whether it is to be recorded, forwarded etc. It also includes any changes you may have made associated with processing. For example, if you activate a packet, and then change the calibrator associated with one of the parameters in the packet, this change will be saved when you save the configuration. There are a few other more general configuration items which also get saved. These include the color preferences you set in the Set Color Preferences dialog and the column configurations you specified in the Telemetry Processing Statistics dialog. When you save a configuration, the Telemetry Processing application will default to the <base_path>\configuration_files\telemetry_processing directory. The <base_path> on a Windows 2000 computer is shown below.

<base_path> = C:\Documents and Settings\<username>\Application Data\TReK

If you would like to configure TReK to use a different default directory, you can set this property using the Set Telemetry Processing Options dialog. You can save your configuration files anywhere you like, but a default directory provides an easy way for you to keep up with your files.

Each of the items on the File menu is described below.

New

New provides a way to start a new configuration. When you start a new configuration any packets in the list are deleted and all activities associated with those packets (such as processing, recording, forwarding, etc.) are stopped. If there are packets in the packet list when New is selected, you will be given the option of saving the configuration before all the packets are deleted from the packet list. The New menu item will be insensitive when there are packets in the packet list which are initializing. As soon as the packet(s) finish initializing the menu item will be available.

Open

Open provides a way to open a previously saved configuration. The Open menu item will be insensitive when there are packets in the packet list which are initializing. As soon as the packet(s) finish initializing the menu item will be available.

Save

Save provides a way to save the current configuration. The Save menu item will be insensitive when there are packets in the packet list which are initializing. As soon as the packet(s) finish initializing the menu item will be available.

Save As

Save As provides a way to save the current configuration with another name. The Save As menu item will be insensitive when there are packets in the packet list which are initializing. As soon as the packet(s) finish initializing the menu item will be available.

Import Displays

Import Displays provides a way to import displays that were created with the Telemetry Processing application.

Export Displays

Export Displays provides a way to export displays that you created with the Telemetry Processing application.

Exit

Exit provides a way to exit the Telemetry Processing application. The Exit menu item will be insensitive when there are packets in the packet list which are initializing. As soon as the packet(s) finish initializing the menu item will be available.

5.2 View Menu

The View menu is used to change attributes associated with the Telemetry Processing main window. There are five items on the View menu. Each is described below:

Status Bar

The Status bar is located at the very bottom of the Telemetry Processing main window. The status bar is used to display messages and useful information to you without interrupting your work. The status bar has "panes," which include "indicators" and a "message line." The indicators provide the status of items such as SCROLL LOCK. The message line on the status bar can display information about program status or about a toolbar button or menu item that you are pointing to with the mouse. If you select the Status Bar item on the View menu, this will toggle the Status Bar on and off.

Set Color Preferences

The Set Color Preferences option brings up the Set Color Preferences dialog. This dialog can be used to turn off, turn on, or change the colors used in the Telemetry Processing main window.

Show Packet List View

The Show Packet List View option configures the Telemetry Processing main window packet list so that each packet in the list occupies an entire row. This is the default view.

Show Packet Snapshot View

The Show Packet Snapshot View option configures the Telemetry Processing main window packet list so that each packet in the list occupies a single cell. This is an

alternate view. It shows eight packets per row instead of one packet per row. For each packet the Packet ID (APID), Packet Type, and Data Mode are shown in an abbreviated format (7-P-RT). This view provides a way to see the status of a large number of packets without scrolling. The colors apply to both views and you can switch between views. Please note that the Packet Snapshot View is "view-only".

Clear Message Area

As mentioned in section 3 the message area is located at the bottom of the Telemetry Processing main window. This is where important status and error messages will be displayed while you are working with the application. If you select the Clear Message Area item on the View menu, this will clear all the messages in the Message Area. Once they have been cleared, you cannot get them back.

5.3 Packet Menu

The Packet menu is the most frequently used menu in the Telemetry Processing application. It is used to add packets to the packet list in the main window, and to control all the activities associated with each packet. Each of the items on the Packet menu are described below.

Add A Packet

Used to identify a particular packet that your TReK System should accept. When you select Add A Packet, a dialog box will be presented so that you can fill in the information your TReK system needs in order to know how to identify the packet.

Add Corresponding UDSM Packet

Used to add a PDSS User Data Summary Message (UDSM) packet to the packet list. If you add a PDSS Payload packet in most cases you will also want to add a PDSS UDSM packet. That is why this menu item is called "Add Corresponding UDSM Packet". You must have a PDSS Payload packet selected in order to use this option. When you select this option, the Add A Packet dialog will appear on your screen. The dialog will be populated with the same properties as the packet you have selected except the packet type will be set to PDSS UDSM instead of PDSS Payload. Additionally, if you have recording set to "On" the base filename will be modified slightly to add "udsm" in order to distinguish the recording files. The "Add Corresponding UDSM Packet" function has been provided for convenience in order to save you some typing. For more information about PDSS UDSM packets (what they are, when they are sent by PDSS) please see the POIC to Generic User Interface Definition Document (SSP-50305).

Add Corresponding RPSM Packet

Used to add a PDSS Retrieval Processing Summary Message (RPSM) packet to the packet list. If you receive an external playback from the POIC Data Storage Manager, an RPSM packet will be generated at the end of the playback. That is why this menu item is called "Add Corresponding RPSM Packet". You must have a PDSS Payload packet selected in order to use this option. When you select this option, the Add A Packet dialog will appear on your screen. The dialog will be populated with the same properties as the

packet you have selected except the packet type will be set to PDSS RPSM instead of PDSS Payload. Additionally, if you have recording set to “On” the base filename will be modified slightly to add “rpsm” in order to distinguish the recording files. The “Add Corresponding RPSM Packet” function has been provided for convenience in order to save you some typing. For more information about PDSS RPSM packets (what they are, when they are sent by the POIC) please see the POIC to Generic User Interface Definition Document (SSP-50305).

Add A CDP Packet

Used to request Custom Data Packets from the POIC. When you select Add A CDP Packet, a dialog box will be presented so that you can fill in the information your TReK system needs in order to request a Custom Data Packet service session with the POIC.

Add A Playback Packet

Used to set up an internal TReK playback. When you select Add A Playback Packet, a dialog box will be presented so that you can fill in all the details about the playback. This includes information such as the location of the stored data files, the length of the playback, and how the playback packets should be processed.

Activate Packet

Used to tell your TReK system to start doing something with the packet (what it does depends on what you told it to do such as process, pass-through, record, etc.). The Activate Packet option is only available when you have a packet selected that has never been activated (i.e., Processing Status is Inactive, Recording Status is Inactive, etc.). Almost all the other Packet menu options (e.g., Pause Processing, Start Recording, etc.) will be unavailable until you activate the packet.

View Realtime ERIS Messages

Used to tell your TReK system to display a window that can be used to view realtime ERIS messages. This option becomes available when you select a custom data packet in the packet list.

View Packets

Used to tell your TReK system to display a window that can be used to view packets in a hexadecimal/text format. This option becomes available when you select a packet in the packet list.

Pause Processing

Used to tell your TReK system to pause processing for a particular packet. Please note that this will only pause processing. If the packet is also being recorded or forwarded these activities will continue even though processing has been paused. The Pause Processing option is only available when you have a packet selected with a Processing Status of Processing.

Resume Processing

Used to tell your TReK system to resume processing for a particular packet. The Resume Processing option is only available when you have a packet selected with a Processing Status of Paused.

Start Recording

Used to tell your TReK system to start recording a particular packet. (Recording can be set up when you initially add a packet to the list, but if you don't specify recording at that time it can be added later using this menu option).

Pause Recording

Used to tell your TReK system to pause recording for a particular packet. Please note that this will only pause recording. If the packet is also being processed or forwarded these activities will continue even though recording has been paused. The Pause Recording option is only available when you have a packet selected with a Recording Status of Recording.

Resume Recording

Used to tell your TReK system to resume recording for a particular packet. The Resume Recording option is only available when you have a packet selected with a Recording Status of Paused.

Stop Recording

Used to tell your TReK system to stop recording a particular packet. The Stop Recording option is only available when you have a packet selected with a Recording Status of Recording or Paused.

Start Playback

Used to tell your TReK system to start a playback. The Start Playback option is only available when you have a playback packet selected with a Playback Status of Ready or Stopped.

Pulse Playback

Used to tell your TReK system to pulse a playback. The Pulse Playback option is only available when you have a playback packet selected that is in Pulse mode and has a Playback Status of "Ready For Pulse".

Pause Playback

Used to tell your TReK system to pause the playback of a particular playback packet. When you select this option this will pause the playback that is currently in progress. No more playback packets will be generated until you resume the playback. The Pause Playback option is only available when you have a playback packet selected that is in Continuous mode and has a Playback Status of Active.

Resume Playback

Used to tell your TReK system to resume the playback of a particular playback packet. When you select this option this will resume the playback. The Resume Playback option is only available when you have a playback packet selected that has been paused.

Stop Playback

Used to tell your TReK system to stop the playback of a particular playback packet. (The Start Playback option can be used to replay the stopped playback packet.) The Stop Playback option is only available when you have a playback packet selected and the Playback Status is Active, Ready For Pulse, or Paused.

Start CDP Transmission

Used to tell your TReK system to request that the POIC start transmission of a Custom Data Packet (CDP). The Start CDP Transmission option is only available when you have a custom data packet selected and the packet has been activated but packet transmission has not been started.

Pause CDP Transmission

Used to tell your TReK system to request that the POIC pause transmission of a Custom Data Packet (CDP). The Pause CDP Transmission option is only available when you have a custom data packet selected, the packet has been activated, and packet transmission has been started.

Resume CDP Transmission

Used to tell your TReK system to request that the POIC resume transmission of a Custom Data Packet (CDP). The Resume CDP Transmission option is only available when you have a custom data packet selected, the packet has been activated, and packet transmission has been paused.

Deactivate Packet

Used to tell your TReK system to stop accepting a particular packet. When you select a packet in the packet list, and then select the Deactivate Packet option, the packet will be deactivated and your TReK system will stop accepting that particular packet. Any other activities associated with that packet such as processing and recording will stop because your TReK system will no longer accept the packet. The Deactivate Packet option is only available when you have an active packet selected. If you want to delete the packet from the list, use the Delete Packet option.

Delete Packet

Used to tell your TReK system to stop accepting a particular packet. When you select a packet in the packet list, and then select the Delete Packet option, the packet will be removed from the list and your TReK system will stop accepting that particular packet. Any other activities associated with that packet such as processing and recording will stop because your TReK system will no longer accept the packet. The Delete Packet option is only available when you have a packet selected.

Show Packet Properties

Used to see a complete list of properties about a particular packet. This includes information such as the Packet ID, the Data Mode, whether the packet is to be recorded, etc. The packet properties are defined when you add the packet to the packet list using either the Add A Packet dialog or the Add A Playback Packet dialog. In fact when you select Show Packet Properties the dialog box that appears looks just like the Add A Packet dialog or Add A Playback Packet dialog (depending on whether the packet is a non-playback packet or a playback packet.)

5.4 Parameter Menu

The parameter menu is used to access information about parameters and to perform functions associated with parameters. For example, if you would like to know which calibrator is being used to calibrate a particular parameter, you would use the Parameters item on the Parameter menu to access the Parameters dialog box. The Parameters dialog box would then be used to access the properties for a particular parameter. From here you would be able to see which calibrator is being used to calibrate that particular parameter. You could also change which calibrator is being used for the parameter. The following list identifies some of the common functions that can be performed using the capabilities available from the Parameter menu:

- View a list that shows which parameters are currently being processed.
- Create and run a text display to view the values associated with parameters being processed by your TReK system.
- Configure and control parameter recording.
- Start or stop monitoring for one or more parameters.
- View a list of monitoring parameters.

Each menu item on the Parameter menu is described below:

Parameters

Provides access to the Parameters dialog box which lists all of the unique parameters currently being processed.

Displays

Provides access to the Displays dialog box. This dialog contains a list of all the displays that have been created. It also provides a way to create new displays, modify existing displays, or run displays.

Recording

Provides access to the Parameter Recording dialog box. This dialog contains a list of all the parameter recording sessions that have been created. It also provides a way to create new parameter recording sessions, modify existing parameter recording sessions, or start and stop parameter recording sessions.

Monitoring

Provides access to the Monitoring dialog box. The Monitoring dialog displays a list of all the unique parameters currently being processed and provides a way to turn monitoring on or off for one or more parameters.

Monitoring Messages

Provides access to the Monitoring Messages dialog box. This dialog box displays monitoring messages.

5.5 Processing Menu

The processing menu is used to access various dialog boxes that can be used to control how your TReK system processes your data. The following list identifies some of the common functions that can be performed using the capabilities available from the Processing menu:

- View a list that shows which calibrators are in use or are available for use.
- View a list that shows which sensors are in use or are available for use.
- View a list that shows which monitors are in use or are available for use.

Each menu item on the Processing menu is described below:

Calibrators

Provides access to the Calibrators dialog box which lists all of the calibrators that are either in use or are available for use.

Sensors

Provides access to the Sensors dialog box which lists all of the sensors that are either in use or are available for use.

Switches

Provides access to the Switches dialog box which lists all of the switches that are either in use or are available for use.

Monitors

Provides access to the Monitors dialog box which lists all of the monitors that are either in use or are available for use.

Error Control for Preprocessed Parameters

Provides access to the Error Control for Preprocessed Parameters dialog box. This dialog displays a list of all the unique error control objects that are either in use or available for use.

5.6 Options Menu

The Options menu is used to access information about general telemetry processing attributes and specific telemetry processing status information. Each of the items on the Options menu is described below.

Show Login Sessions

Used to see a list of all Login Sessions to other systems. This includes ERIS Login Sessions and TReK Login Sessions.

Set Telemetry Processing Options

Used to set TReK telemetry processing options such as the status character separator and the size of data recording files.

Show Telemetry Processing Statistics

Used to view specific telemetry processing statistics information. This includes information such as the number of packets received, the number of packets dropped, the number of packet sequence errors, etc. In most cases, this statistics information will only be needed when you need to perform trouble-shooting. Unless the Telemetry Processing application gives you a warning message indicating that you may be losing packets, then you should assume that everything is functioning nominally. However, if you receive a warning message, the message may direct you to this menu option so that you can view the telemetry processing statistics information.

Recorded Data Viewer

Provides access to the Recorded Data Viewer. The Recorded Data Viewer is used to view information stored in a TReK recording file.

Extract Data From TReK Recording Files

Provides access to the Extraction Wizard. The Extraction wizard provides a way to extract data values, on an individual parameter basis, from TReK recording files.

Convert Data Storage Manager Files

Used to convert data stored in a POIC Data Storage Manager data file to TReK Recording files. This data can then be played back using the TReK local playback feature.

5.7 Help Menu

The Help menu is used to access on-line help for the Telemetry Processing application. Each of the items on the Help menu is described below.

Help Topics

Used to access the typical Windows Contents and Index on-line help window.

About Telemetry Processing

Used to view the About Telemetry Processing dialog.

5.8 Packet List Pop-Up Menu

The Packet List pop-up menu can be accessed by clicking the right mouse button in the packet list area of the main window. If you right click in the packet list area of the window, but you do not click on a packet in the list, many of the menu items will be insensitive. This is because many of the menu items are only applicable when a packet is selected. If you right click on a packet in the packet list all the menu items which are applicable to that particular packet at that moment in time will be sensitive. The Packet List Pop-Up menu is identical to the Packet menu on the menu bar.

5.9 Windows Edit Pop-Up Menu

The standard Windows Edit Pop-Up Menu can be accessed whenever your cursor is located inside an edit field inside the Telemetry Processing application. This menu contains the standard edit commands such as Cut, Copy, and Paste.

6 Telemetry Processing Dialogs

This section describes all the dialogs in the Telemetry Processing application. For an example of how some of these dialogs are used while working with the Telemetry Processing application please see the Telemetry Processing Tutorial (TREK-USER-017).

6.1 Import Displays Dialog

The Import Displays dialog is shown in Figure 3 below. It is used to import displays that were created with the Telemetry Processing application. This dialog behaves like the standard Windows Open dialog.

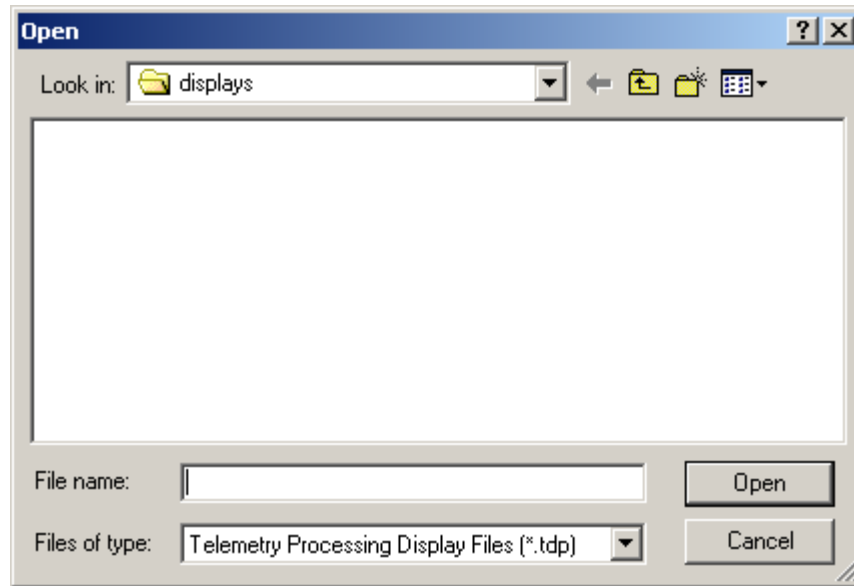


Figure 3 Import Displays Dialog

6.2 Import Item Exists Dialog

The Import Item Exists Dialog is shown in Figure 4 below. This dialog will be displayed if you attempt to import a display with a name that matches a display in your current configuration.

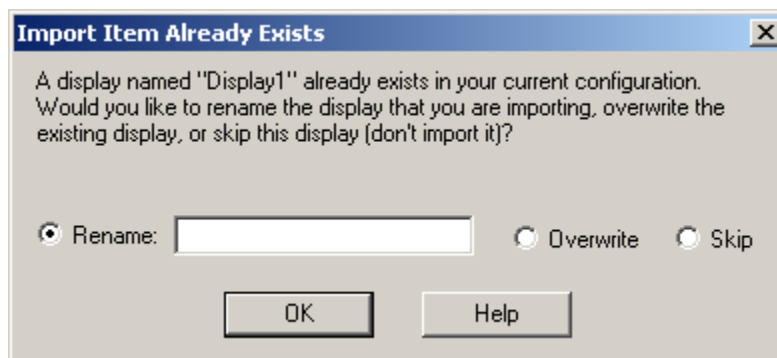


Figure 4 Import Item Exists Dialog

If you select Rename, the display you are attempting to import will be renamed and then imported. If you select Overwrite, the display that exists in your current configuration will be overwritten with the display you are importing. If you select Skip, the display will not be imported.

6.3 Export Displays Dialog

The Export Displays Dialog provides a way to export displays that you created with the Telemetry Processing application. There are two steps that need to be completed when exporting displays: (1) identify the displays to export and (2) identify the location where the exported displays file should be stored. The Export Displays (Step 1) dialog is shown in Figure 5 below. This dialog is used to identify the displays to export. You can select one or more displays to export. All the displays are exported (stored) in a single file. This file can be used to import displays from one Telemetry Processing configuration into a different Telemetry Processing configuration. Once you have finished selecting one or more displays to export, you push the Next button. This will take you to the Export Displays (Step 2) Dialog shown in Figure 6 below. The Export Displays (Step 2) Dialog provides a way to identify the location to store the exported displays file. You can use the Browse button to select a location without typing. Once you have entered the location into the “Save Export File As” field push the Finish button to complete the export process.

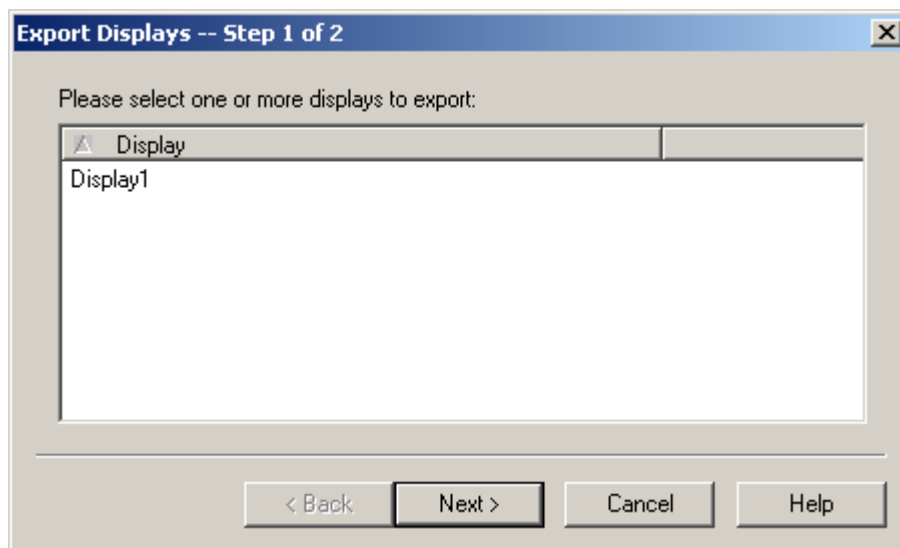


Figure 5 Export Displays (Step 1) Dialog

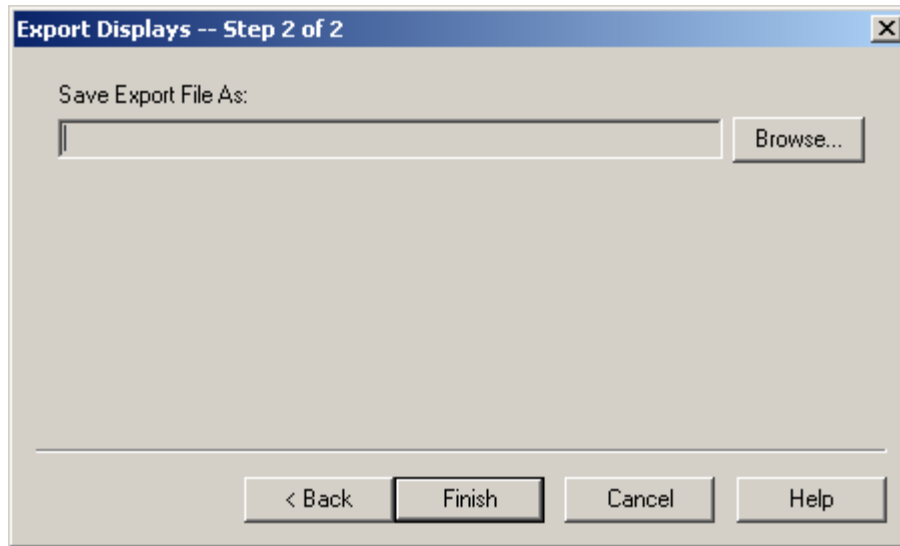


Figure 6 Export Displays (Step 2) Dialog

6.4 Set Color Preferences Dialog

The Set Color Preferences dialog is shown in Figure 7 below. It is used to control the color feature associated with the Telemetry Processing main window packet list. The Telemetry Processing application checks for data receipt for each packet in the packet list. The color of a packet in the packet list indicates the packet's data receipt status. The color feature can be turned off. If it is off the packets in the packet list will always be black. If the color feature is on, the packets in the packet list will turn a specific color based on the data receipt status and the colors assigned in the Set Color Preferences dialog. Data receipt refers to whether there are any packets arriving that match the packet identified. Recall from the TReK Telemetry Tutorial (TREK-USER-002) that there are three criteria which make a packet unique: Packet ID (APID), Packet Type, and Data Mode. Therefore, if you are receiving data for a particular packet this means that packets are arriving that match these three criteria. TReK checks on the data receipt status of each packet based on the packet's "Expected Packet Rate" property. The "Expected Packet Rate" property is defined when the packet is added to the main window packet list (via the Add A Packet dialog). The data receipt status is determined by evaluating whether any packets containing the data arrived in the expected time interval. This technique is used in order to avoid the display flicker that might occur if the color is changed every time a single packet arrives. For more information about the data receipt status and how to interpret color changes please see the special topic in section 7.6 called "How do I interpret the colors in the Telemetry Processing main window?"

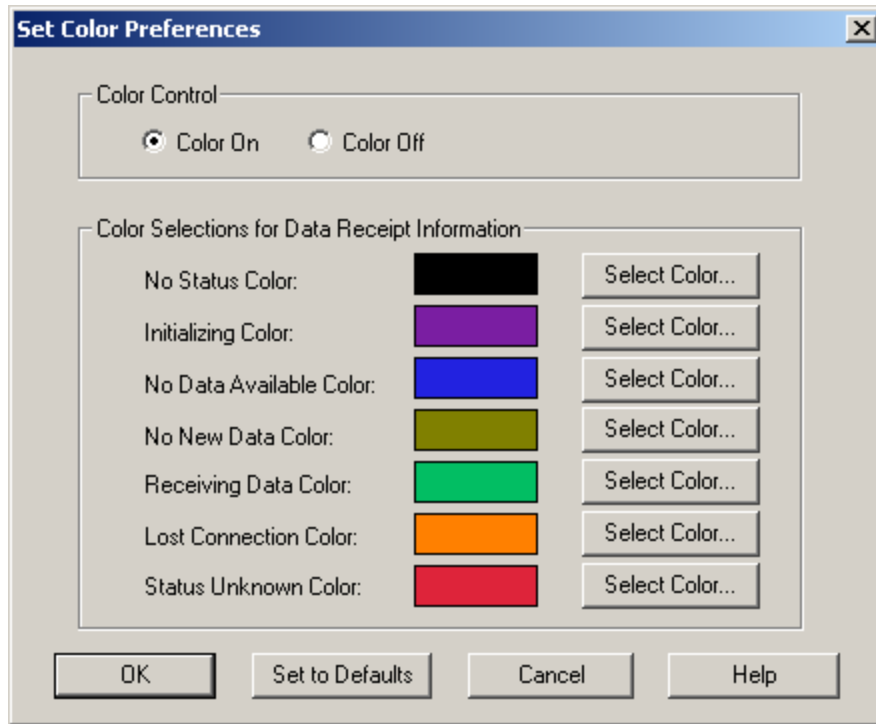


Figure 7 Set Color Preferences Dialog

Each field and control on the Set Color Preferences dialog is described below.

Color On

Turns the color feature on.

Color Off

Turns the color feature off.

No Status Color

The color assigned when the status of the packet is “No Status”. “No Status” indicates that there is no information available about the packet. This will be the case when the packet has been added to the packet list but it has not been activated. In this situation your TReK system has not been told to do anything about the packet and therefore has no status information about the packet. (Default Color: Black)

Initializing Color

The color assigned when the status of the packet is “Initializing”. This status will occur when the packet is in the process of activating. (Default Color: Purple)

No Data Available Color

The color assigned when the status of the packet is “No Data Available”. This status will occur when the packet has been activated (meaning your TReK system is ready and waiting for data to arrive) but your TReK system has never received any data that

matches the packet criteria (Packet ID, Packet Type, and Data Mode). (Default Color: Blue)

No New Data Color

The color assigned when the status of the packet is “No New Data”. This status will occur when the packet has been activated and data has been received for this packet at least once, but the latest data receipt status check indicates that no new data has arrived in the time interval it was expected. (Default Color: Gold)

Receiving Data Color

The color assigned when the status of the packet is “Receiving Data”. This status will occur when the packet has been activated and the data receipt status check indicates that data has been received for this particular packet in the time interval it was expected. (Default Color: Green)

Lost Connection Color

The color assigned when the status of the packet is “Lost Connection”. This status is only applicable to Custom Data Packets. This will occur when the packet has been activated and one of the socket connections associated with the packet (request socket or data socket) is lost. (Default Color: Orange)

Status Unknown Color

The color assigned when the status of the packet is unknown. This will occur if the packet has been activated but an error occurs while trying to determine the data receipt status of the packet. (Default Color: Red)

Buttons

Select Color

The Select Color button is used to access the standard Windows Color dialog in order to change the assigned color.

Set to Defaults

The Set to Defaults button will reset all the fields and controls in the Set Color Preferences dialog box to the original values that were in place when the TReK software was installed.

6.5 Add A Packet (General Tab) Dialog

The Add A Packet dialog is used to add a packet to the packet list in the main window. Remember that this is how you tell your TReK system to begin accepting a particular packet. Packets are uniquely identified by a combination of packet ID, data mode, and packet type. As can be seen in Figure 8 there are two tabs in the Add A Packet dialog. The General tab is divided into two sections: Packet Information and Packet Receipt.

The Packet Information section contains information that tells your TReK system how to identify the packet and what type of processing should be performed when the packet arrives. The Packet Source sections tell your TReK system where to look to find the packets. For instance, you may be receiving your data from PDSS via UDP on a unicast address. Or you may receive the data through an RS 232 Serial Port.

Figure 8 Add A Packet (General Tab) Dialog

Each field on the General Tab of the Add A Packet dialog is described below.

Database (Required Field)

The database field is used to tell your TReK system which database to use when processing (decommutating, calibrating, sensing, etc.) your packet and the parameters inside the packet. The database field must contain the complete directory path and name for your database. An example of this is

c:\TReK\database\TelemetryDatabase.mdb. If you don't know the complete path, you can push the Browse... button located to the right of the Database field. This will bring up a Windows Open dialog box that you can use to search local directories to find your database file. The Open dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to the Windows on-

line help. The Open dialog will default to the <base_path>\database directory. The <base_path> on a Windows 2000 computer is shown below.

<base_path> = C:\Documents and Settings\<username>\Application Data\TReK

If you would like to configure TReK to use a different default directory, you can set this property using the Set Telemetry Processing Options dialog. You can save your database files anywhere you like, but a default directory provides an easy way for you to keep up with your files.

Packet ID (APID) (Required Field)

The Packet ID is one of the primary packet attributes that is used by your TReK system to identify a packet. The term Packet ID is synonymous with the term Application Process ID (APID). As described in the TReK Telemetry Tutorial (TREK-USER-002), the Packet ID (or APID) is located in the primary header of a Consultative Committee for Space Data Systems (CCSDS) packet. When a packet arrives at your TReK system, this header is checked to determine whether the packet should be accepted or dropped. If you don't have the Packet ID memorized, you can Browse the database to find the Packet ID.

Packet Type (Required Field)

The Packet Type field is used to tell your TReK system something about the source of the packet and the packet format. There are a fixed set of packet types. The packet types shown in bold are the ones most applicable to ISS payload teams.

Packet Type	Description
CCSDS	Consultative Committee for Space Data Systems (CCSDS) packets are the core packet type used by the International Space Station program. Once these packets reach the ground, they are normally distributed with additional headers. For example, science data is distributed in a PDSS Payload packet which is comprised of a CCSDS packet with an EHS header. That being said, there may be times when you have a data source that generates a CCSDS packet without additional headers. This packet type exists so you can send these packets directly to your TReK system.
CDP	Custom Data Packets (CDP) are sent via TCP from the POIC. When configuring your TReK system to request and receive CDP packets from the POIC, the Add A CDP Packet dialog should be used. The Add A Packet dialog is only used to configure TReK to receive CDP packets that are being forwarded from another TReK system. Please see the Add A CDP Packet dialog section for more information about Custom Data Packets.
EXPRESS	The EXPRESS packet type corresponds to the EXPRESS packet format used in the interface between a payload and an ISS EXPRESS rack. If you like, you can send EXPRESS packets generated by your payload or test equipment directly to your TReK system.
FDP	Functionally Distributed Processor packets are used internally within the POIC. These types of packets are not distributed to ISS payload teams.
GSE	GSE stands for Ground Support Equipment. There are two types of GSE packets: Ground Ancillary Data GSE packets and user defined GSE packets. You should select GSE for either of these types. GSE packets are sent from the POIC. For more information about GSE packets please see the POIC Capabilities Document (SSP-50304).
GSE Merge	The POIC also provides a capability to merge different time segments of GSE

	data into one stream. When this capability is used the POIC will distribute this data as GSE Merge data.
IMAQ ASCII	This packet type was added to TReK to support a very specific application related to NASA's Return to Flight activities. It is not applicable to ISS. It is used to interface with an infrared camera that communicates via ASCII data with a combination carriage return line feed terminator.
PDSS Core	PDSS Core packets are not distributed outside of the POIC. However, it is possible to use TReK to receive PDSS Core data when a TReK system is located within the POIC.
PDSS Payload	PDSS Payload packets are sent from the Payload Operations Integration Center (POIC) (or can be generated by the TReK Training Simulator application). The POIC will send you these packets if you entered a requirement to receive these packets in the Payload Data Library prior to the beginning of your operations activities. Most science data is distributed in PDSS Payload packets.
PDSS RPSM	PDSS Retrieval Processing Summary Message (RPSM) packets are output by the POIC's PDSS Data Storage Manager (DSM) system. A PDSS RPSM packet is generated when data is retrieved from the PDSS DSM. For more information about PDSS RPSM packets please see the POIC Capabilities Document (SSP-50304).
PDSS UDSM	There is a PDSS User Data Summary Message (UDSM) packet associated with a PDSS Payload packet. If you add a PDSS Payload packet in most cases you will also want to add a PDSS UDSM packet. For more information about PDSS UDSM packets (what they are, when they are sent by PDSS) please see the POIC to Generic User Interface Definition Document (SSP-50305).
PRCU	The Payload Rack Checkout Unit (PRCU) packet type corresponds to packets output by a PRCU. The PRCU packet type is applicable if you are working with a PRCU system. These packets are actually CCSDS packets.
Suitcase Simulator	Suitcase Simulator packets are sent from a Suitcase Simulator system (or can be generated by the TReK Training Simulator application). The Suitcase Simulator packet type is applicable if you are working with a Suitcase Simulator system. These packets are actually CCSDS packets.
UFO	The UFO packet type is used when you want to send "unidentifiable" packets to your TReK system. This packet type provides a way to utilize typical TReK services like recording, forwarding, and viewing even when TReK does not recognize the incoming packet format. (Note: If you decide you want TReK to identify and process these packets, you can always add the packet definition to the TReK database).
VCDU	Virtual Channel Data Unit. This packet type is used to receive VCDUs. ISS Payload teams do not receive this type of data directly. The POIC's PDSS system receives VCDU data and performs a pre-processing function to repackage the CCSDS data contained in the VCDUs into other packet types such as PDSS Payload packets.

Data Mode (Required Field)

The Data Mode field is used to tell your TReK system what type of data mode is associated with your packet. There are a fixed set of sixteen data modes which are supported by your TReK system. They are: None, RealTime, Dump1, Dump2, Dump3, Playback1, Playback2, Playback3, Playback4, Playback5, Playback6, Playback7, Playback8, Playback9, Playback10, and Playback11. The None data mode is only used

with Suitcase Simulator packets. It should never be used for data that you receiving from the POIC. Since Suitcase Simulator packets are CCSDS packets and do not have an EHS header, they do not have a data mode. If you select a playback data mode, this indicates that you're expecting a playback from an external source (your supporting facility). Local TReK playbacks are handled through the Add A Playback Packet dialog. Please see section 6.20 for more information about local playbacks.

Type of Processing (Required Field)

The Type of Processing field is used to tell your TReK system what type of processing should be performed when the packet arrives. The choices for Type of Processing are as follows:

Process Entire Packet

If you choose Process Entire Packet, this means that the packet should be processed and all the individual parameters that make up the packet should be extracted. By choosing this option, you will have access to all the individual parameters in the packet through the TReK Application Programming Interface (API). This is the default for Type of Processing. Please see the TReK Telemetry Application Programming Interface Reference Manual (TREK-USER-027) for more information about how you can access this data. For more information on this processing type please see the TReK Processing Types (TREK-USER-016) white paper.

Process Selected Parameters

Each parameter in a TReK telemetry database has a Process Flag associated with it. Please see the TReK Telemetry Database User Guide (TREK-USER-005) for information about the Process Flag. The Process Flag is located in the Node table and it indicates whether the parameter should be processed. If you choose Process Selected Parameters, this means that all the parameters in the packet that have the Process Flag set to 'Y' should be processed. These are the only parameters in the packet that will be processed. For more information on this processing type please see the TReK Processing Types (TREK-USER-016) white paper.

Process On Request Hybrid

If you choose Process On Request Hybrid this means that parameters that have the Process Flag set to 'Y' should be processed, and the other parameters in the packet should only be processed upon request. The Process Flag is only used to establish the initial set of parameters to be processed. Other parameters will be processed upon request regardless of the state of the Process Flag. For more information on this processing type please see the TReK Processing Types (TREK-USER-016) white paper.

Process On Request Only

If you choose Process On Request Only, TReK will initially only process measurements in the packet headers (EHS header and CCSDS header). However, if you start a user product, such as a Visual C++ program, that requests one or more parameters through the TReK User API, then these parameters will be added to the processing list. This is why

this option is called Process On Request. Parameters are only processed when you request that they be processed. The request for processing services is made indirectly by making a User API call to retrieve the parameter. Once you make a request for a parameter, this parameter will continue to be processed as long as the packet is active. For more information on this processing type please see the TReK Processing Types (TREK-USER-016) white paper.

Pass-Thru

If you choose Pass-Thru, the CCSDS portion of the packet will be extracted, but the packet will not be processed. This means that you can use the TReK API to retrieve the EHS, CCSDS, or data zone portions of the packet, but not any of the individual parameters in the data zone of the packet. Please note that if you are using the Pass-Thru capability the APID for your packet must be defined in the database. Please see the TReK Telemetry Database User Guide (TREK-USER-005) for information about adding data to the database.

Off

If you choose Off, this indicates that you don't want to process or pass-thru the packet. This is something you might do if you want to record the packet or forward the packet, but you are not interested in having it processed in any way.

These options are described in more detail in the TReK Telemetry Tutorial (TREK-USER-002) and the TReK Processing Types white paper (TREK-USER-016).

Local IP Address (Required Field if Packet Source is Network)

The Local IP address field is used to tell your TReK system the IP address that is being used by the packet sender (such as PDSS) to get the packet to you. It's kind of like your home address on a letter that is arriving via your local postal service. The person who is sending the letter puts your address on it so the post office knows where to deliver the letter. The system that is sending packets to you uses your IP address (and port number) to tell the networks along the way how to get the packets to you. In most cases you will probably enter your local TReK system's unicast IP Address. The IP Address field will automatically default to your local unicast IP address. If you want to see a list of all the IP addresses for your machine, just push the Browse button next to the IP address field. Your TReK system retrieves your local unicast IP address from the Windows registry. If you are not familiar with the registry don't worry about it. You don't need to be familiar with the registry to use your TReK system.

In some cases, your packet sender may use a multicast IP address to send the packet to you. In this case, you will need to join a Multicast Address Group in order to receive your data. (Note: Even if your data is being sent to a multicast address, you must also enter your unicast IP address in the IP address field. This information is needed by the TReK software.)

Your data sender will either use a unicast address or a multicast address to send your data (not both). If you don't know what this information is, check with the people on your payload team who entered the requirements in the Payload Data Library or who have worked with the people at the POIC to define these data routing attributes.

If you are working with the TReK Telemetry Trainer application, and your machine does not have network connectivity (such as no ethernet card or modem or the system is not connected to a network), set the IP address to 127.0.0.1. This is called a loopback address and can be used while you are working in standalone mode.

Local Port Number (Required Field if Packet Source is Network)

The Local Port Number is used to tell your TReK system which port to watch in order to find your packet when it arrives. The Port Number is very similar to the IP address in that it identifies specific information about how the packet will get to you. If you don't know what this information is, check with the people on your payload team who entered the requirements in the Payload Data Library or who have worked with the people at your supporting facility to define this data transmission attribute.

If you are working with the TReK Telemetry Trainer application, you will define the Destination Port Number that should be used when the packet is generated. Therefore, make sure you identify the same Port Number here on the receiving side in the Telemetry Processing application. Otherwise, the packet won't be accepted by your TReK system even though your TReK system is generating it. (Note: Make sure that you use the Destination Port Number you identified in the Telemetry Trainer and not the Source Port Number. If you try to use the Source Port Number this will cause an error.)

Protocol (Required Field if Packet Source is Network)

Your data sender will either use the User Datagram Protocol (UDP) or the Transmission Control Protocol (TCP) to transmit your data. When using TCP, you can configure TReK to be a server or a client.

Additional Protocol Settings

The Additional Protocol Settings section provides a way to configure settings associated with a specific protocol. For example, when using UDP you can join zero or more multicast groups. Therefore, the "Join Multicast Address Groups" button is available when UDP is selected. There are no additional protocol settings associated with the TCP Server selection. If you select TCP Client, you will need to enter a Remote Server IP Address and Remote Server Port Number.

Identify Device By (Required Field if Packet Source is Device and Port Name is Selected)

The Packet Type field is used to tell your TReK system something about the source of the packet and the packet format. There are a fixed set of packet types. The packet types identifies the computer port where the data will arrive. This should be a registered name for a port on the computer (e.g. COM1, COM2, LPT1, etc.).

Identify Device By (Required Field if Packet Source is Device)

The Identify Device By option menu is used to indicate the type of device that TReK should communicate with to receive data.

Port Name/GUID/API Library (Required Field if Packet Source is Device)

If the “Identify Device By” option menu is set to Port Name, then the title of this field will be Port Name, and a port name must be entered. If the “Identify Device By” option menu is set to GUID, then a GUID must be entered. The GUID is associated with the computer port where the data will arrive. A GUID is a Microsoft implementation of the distributed computing environment (DCE) universally unique identifier (UUID). If the “Identify Device By” option menu is set to API Library, then a Dynamic Link Library (DLL) must be entered. This library provides the communication support between TReK and the device. The Browse button next to the field can be used to browse for the DLL.

Advanced Button

The Advanced button displays the Advanced Device dialog which provides a way to set advanced options associated with devices.

Expected Packet Rate (Required Field)

The Expected Packet Rate is used to tell your TReK system how often to expect new packets to arrive. This value can be entered in packets per second or bits per second.

6.6 Add A Packet (Options Tab) Dialog

The Options Tab, shown in Figure 9, provides a way to configure optional packet services. The Options tab is divided into four sections: Packet Recording, Packet Forwarding, Packet Viewing, and Packet Statistics Recording. The Packet Recording section is used to identify whether the packet should be recorded and if so where the recorded packets should be stored. The Packet Forwarding section provides a way for you to indicate whether the packets received should be forwarded to another system. You can identify that packets should not be forwarded or that the packets should be forwarded to one or more external machines. The Packet Viewing section is used to configure packet viewing. This is how you identify how many packets should be displayed when you push the Pulse button in the View Packets dialog. If you turn packet viewing off, you will still be able to bring up the View Packets dialog, but no packets will be displayed when you push the Pulse button in the View Packets dialog. The Packet Statistics Recording section is used to identify whether packet statistics should be recorded and if so where the statistics file should be stored.

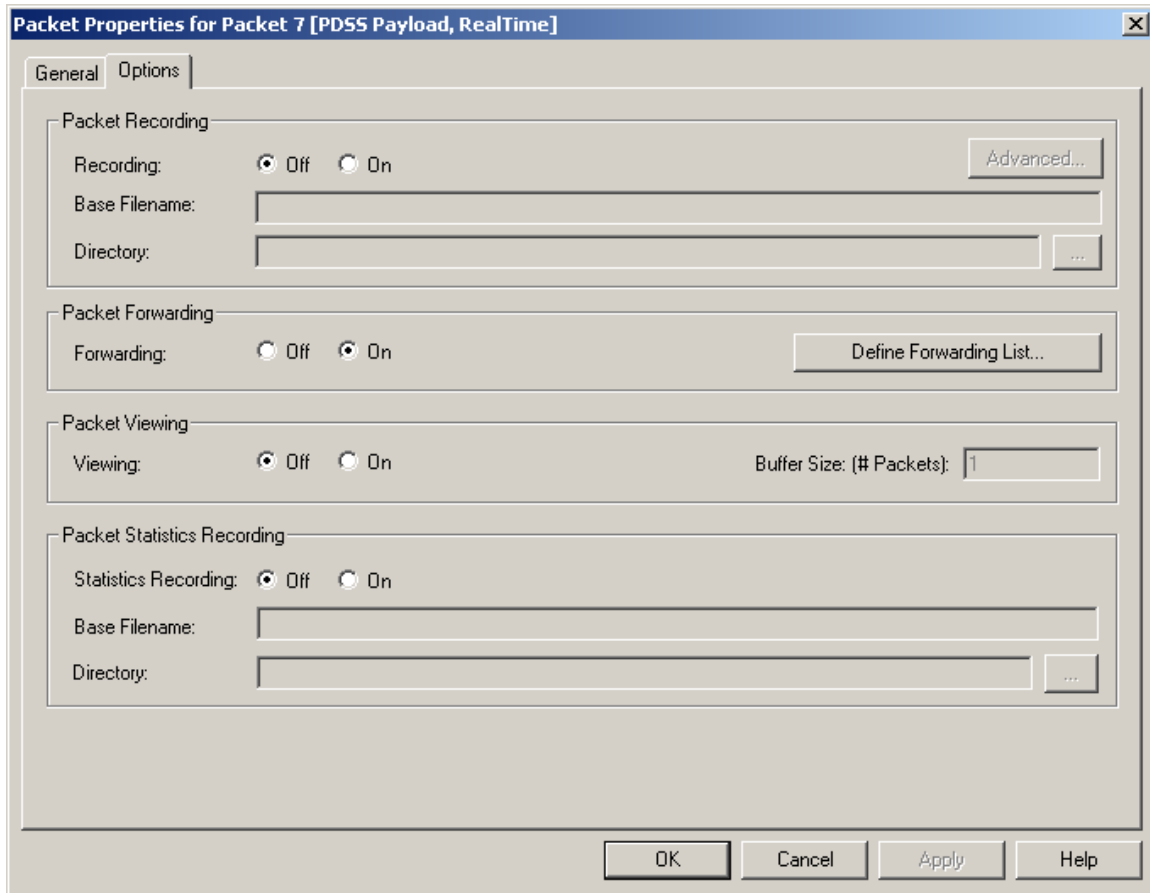


Figure 9 Add A Packet (Options Tab) Dialog

Each field on the Options Tab of the Add A Packet dialog is described below.

Recording (Required Field)

The Recording option is used to tell your TReK system whether the packet should be recorded. Please be aware that recording data can take up a large amount of disk space. Make sure you have enough space to hold all the data recording files. The Advanced Recording features that are available when you push the “Advanced” button are described in section 6.33.

Base Filename (Required Field if Recording is On)

When your TReK system records a packet, the raw packet data is stored in one or more files in a local directory. A base filename (provided by you) is used as the base name of the file and the rest of the file name is generated by your TReK system. The complete filename indicates the time the file was created and closed. When you want to play the data back, you will be asked to provide this Base Filename. Therefore, you should try to select a meaningful name that will be easy to remember and is closely associated with the data that you are recording.

Directory (Required Field if Recording is On)

The Directory information is used to tell your TReK system which directory should be used when storing your data recording files. When you want to play the data back, you will be asked to provide this Directory information so your TReK system can find the files. This field requires a complete directory path. An example of this is

c:\MyRecordingFiles\.. If you don't like to type or you need help defining the complete path, you can push the ... (dot dot dot) button located to the right of the Directory field. This will bring up a Windows Browse for Folder dialog which you can use to identify the local directory path where you want to store your recorded data files. The Browse for Folder dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help.

Forwarding (Required Field)

The Forwarding option is used to tell your TReK system whether the packets received should be forwarded. If you turn forwarding on you should use the "Define Forwarding List" button to access the Define Forwarding List dialog box where you can enter the forwarding list information. The Define Forwarding List dialog is described in section 6.28.

Viewing (Required Field)

The Viewing option is used to tell your TReK system whether the incoming packets should be available for viewing. Viewing does use CPU and memory resources so if you don't need to view the packets leave viewing off. Packet viewing is most useful as a diagnostic tool. The View Packets dialog can be seen in Figure 38.

Buffer Size (# Messages) (Required if Viewing is On)

The Buffer Size tells your TReK system how many packets to store in memory at a time. The buffer will wrap and older packets will be overwritten. This is a safeguard against using up too much memory. This buffer is only associated with viewing. Therefore, setting the size of this buffer will not affect the TReK Queues (buffers) that are used to store incoming packets for processing, recording, etc.

Statistics Recording (Required Field)

The Statistics Recording option is used to tell your TReK system whether packet statistics should be recorded. You can always view the statistics information using the Telemetry Processing Statistics dialog. However, you can also record the statistics information. The statistics information is stored in a Microsoft Excel file which can be viewed using the Microsoft Excel product.

Base Filename (Required Field if Statistics Recording is On)

When your TReK system records packet statistics, the statistics are stored in an excel file in a local directory. A base filename (provided by you) is used as the base name of the file and the rest of the file name is generated by your TReK system. The complete filename indicates the time the file was created and closed.

Directory (Required Field if Statistics Recording is On)

The Directory information is used to tell your TReK system which directory should be used when storing your statistics file. This field requires a complete directory path. An example of this is `c:\MyRecordingFiles\.` If you don't like to type or you need help defining the complete path, you can push the ... (dot dot dot) button located to the right of the Directory field. This will bring up a Windows Browse for Folder dialog which you can use to identify the local directory path where you want to store your recorded data files. The Browse for Folder dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help.

6.7 Advanced Device Dialog

The Advanced Device dialog provides a way to configure advanced settings associated with receiving data from a device or forwarding data to a device. The Advanced Device dialog is shown in Figure 10. Please note that when this dialog is used to set properties associated with receiving data from a device the "Packets per Buffer" property is not available.

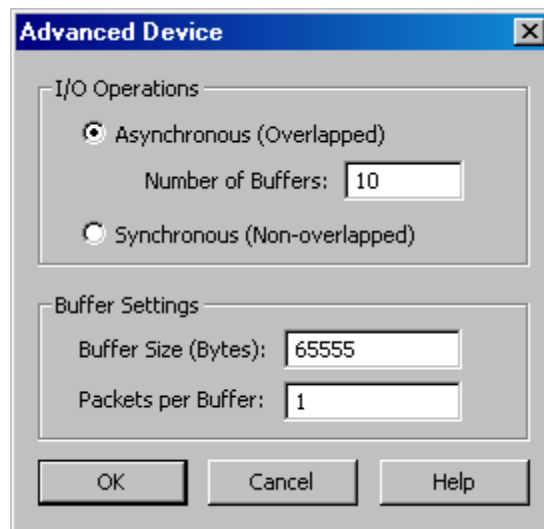


Figure 10 Advanced Device Dialog

Each field and control on the Advanced Device dialog is described below.

Asynchronous (Overlapped)

Asynchronous (Overlapped) I/O operation allows TReK to issue multiple I/O operations and do work in the background while the I/O operations are pending. It is a more efficient operating mode.

Number of Buffers (Required Field if Asynchronous is Selected)

Number of Buffers defines the number of I/O buffers that are available for the I/O requests. For instance, if you are receiving data, and the “Number of Buffers” is set to ten, TReK will issue a maximum of ten pending read requests during the I/O operation

Synchronous (Non-overlapped)

Synchronous (Non-overlapped) I/O operation configures TReK to only issue a single I/O operation at a time. It is less efficient but may be the proper choice for some applications.

Buffer Size (Required Field)

Buffer Size defines size used to create the buffers (in bytes) that are used to store the incoming data or outgoing data for the I/O operation. It is important to choose a size that will support the maximum read or write operation.

Packets per Buffer (Required Field)

Packets per Buffer is used when performing an output or write operation. It defines the number of packets that are stored in the buffer prior to issuing a write request. For low packet rates, the default value of one is sufficient. However, for packet rates greater than 1000 packets per second, incrementing this value minimizes some of the loading that TReK places on the CPU.

6.8 Add Corresponding UDSM Packet Dialog

The Add Corresponding UDSM Packet dialog is identical to the Add A Packet dialog with regard to functionality. The main difference is that you cannot modify properties that must match the corresponding PDSS Payload packet such as Packet ID, Data Mode, Local IP Address, etc. Please see the Add A Packet dialog section for details about the functionality provided by the Add Corresponding UDSM Packet dialog.

6.9 Add Corresponding RPSM Packet Dialog

The Add Corresponding RPSM Packet dialog is identical to the Add A Packet dialog with regard to functionality. The main difference is that you cannot modify properties that must match the corresponding PDSS Payload packet such as Packet ID, Data Mode, Local IP Address, etc. Please see the Add A Packet dialog section for details about the functionality provided by the Add Corresponding RPSM Packet dialog.

6.10 Add A CDP Packet Dialog

The Add A CDP Packet dialog is used to add a Custom Data Packet to the packet list in the main window. Custom Data Packets are created and generated by the POIC. The Custom Data Packet service provides a way to request and receive telemetry parameters

that are being processed within the POIC. The Custom Data Packet service is often referred to as an “on-the-fly” service. You do not have to pre-define a custom data packet or store the custom data packet definition in the POIC’s telemetry database (as you do with GSE packets). Instead, you submit a request for custom data packets at the time you are ready to receive the data. The interface between TReK and the POIC involves three socket connections. These are shown in Figure 11.

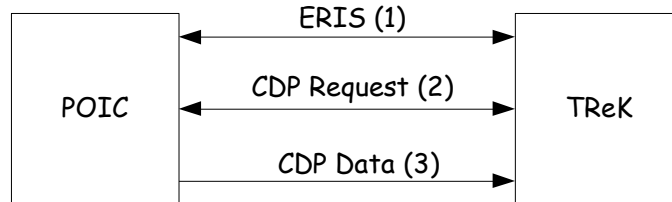


Figure 11 Custom Data Packet Socket Connections

While we would like for this interface to be transparent to you, there is a little you need to know about what is occurring behind the scenes. The following steps describe the sequence of events that occur when using the Custom Data Packet service.

Step 1

Using the Add A CDP Packet dialog you enter several pieces of information including (but not limited to):

- Information needed to communicate with ERIS in order to log into the POIC and request a Custom Data Packet service session.
- The Port number for the socket that is used to communicate the CDP request information.
- The Port number for the socket that is used to receive the custom data packets.
- The list of parameters that you would like to request and receive from the POIC.
- The location and name for a new TReK database that will be created to hold the custom data packet definition once it is received from the POIC.
- Other information about packet recording, packet viewing, etc.

Step 2

Once you have added the packet to the main window list you activate the packet.

Step 3

During activation, the following sequence of events takes place:

1. TReK first communicates with ERIS to log into the POIC and request a Custom Data Packet service session.
2. ERIS starts a Custom Data Packet (CDP) service session and the POIC CDP process connects back to the TReK request socket

3. TReK sends the Custom Data Packet request across the request socket. This request includes the list of parameters that you would like to receive and the port number where the POIC should send the data packets.
4. The POIC CDP process sends a reply back to TReK across the request socket. This reply contains a variety of important information including:
 - The packet definition for the custom data packet. This is stored in the TReK database you identified in the Add A CDP Packet dialog.
 - Information about the parameters you requested (availability, etc.).
 - The Packet ID. You will notice that when you add a Custom Data Packet to the main window packet list, the Packet ID will be C<number>. For example: C0. At the time you add the packet to the list, the Packet ID is unknown because this information is provided by the POIC in the CDP reply. Once TReK receives the Packet ID from the POIC, the Packet ID will be updated. When you use the TReK User API to retrieve data in the custom data packet, you will use the Packet ID provided by the POIC (not the dummy Packet ID that is used when the packet is first added to the list). Each time you activate the CDP packet, the POIC will provide a new Packet ID. Therefore, if you open a configuration file containing a Custom Data Packet, the Packet ID will be reset to a dummy Packet ID until the packet is activated.

Step 4

If everything is successful (and the data requested is available), the POIC CDP service connects to the TReK CDP Data socket. At this point the packet is activated and turns blue.

Step 5

To start transmission of the data, you push the Start CDP Transmission button on the Packet menu. Note: There is no Stop button. There is a Start CDP Transmission button, Pause CDP Transmission button, and a Resume CDP Transmission button. You can Pause the CDP transmission, but to Stop (shutdown) the CDP transmission you must delete the packet from the packet list.

Firewall -- Network Address Translation Note: If your PC is located behind a firewall that is using Network Address Translation, simply fill in the Network Address Translation area of the dialog and the software will ensure that the correct IP address and ports will be used when the POIC connects or transmits data to your computer.

6.11 Add A CDP Packet (General Tab) Dialog

As can be seen in Figure 12 there are four tabs in the Add A CDP Packet dialog: General, Login, Parameters, and Options. The General tab is divided into three sections: General, Packet Request and Receipt, and Duration and Update Rate.

Add A CDP Packet

General | Login | Parameters | Options

General

POIC Database: Data Mode:

Name and Location for Newly Created TReK Database that will hold CDP Packet Definition

TReK Database Name:

TReK Database Directory: ...

Type of Processing:

Packet Request and Receipt

Local IP Address: Browse...

Local Port Number for Request:

Local Port Number for Data Packets:

☐ Firewall In Use (Network Address Translation Needed)

Firewall IP Address: Firewall Request Port: Firewall Data Port:

Duration

☒ Infinite ☐ Specify Days Hours Mins Secs

Packet Rate

Packet Rate: ☐ Rate Equivalent to the Fastest Source APID ☒ Time Between Packets (seconds):

Expected Packet Rate (packets/sec):

OK Cancel Apply Help

Figure 12 Add A CDP Packet (General Tab) Dialog

Each field and control on the General Tab is described below.

POIC Database (Required Field)

This is the database that should be used by the POIC when processing the parameters you have requested. Choices are Baseline or Archive.

Data Mode (Required Field)

This is the data mode associated with the parameters you are requesting.

TReK Database Name (Required Field)

The name of the new TReK database that will be created to hold the packet definition.

TReK Database Directory (Required Field)

The directory location where the new TReK database will be stored.

Type of Processing (Required Field)

The Type of Processing field is used to tell your TReK system what type of processing should be performed when the packet arrives. The choices for Type of Processing are as follows: Process Entire Packet, Process Selected Parameters, Process On Request Hybrid, Process On Request Only, Pass-Thru, Off. For more information about these types of processing please refer to section 6.5.

Local IP Address (Required Field)

The Local IP address is sent to the POIC so the POIC knows where to send the custom data packets.

Local Port Number for Request (Required Field)

The Port Number TReK should use for the request socket.

Local Port Number for Data Packets (Required Field)

The Port Number where the POIC should send the data packets.

Firewall In Use (Required Field)

The Firewall In Use checkbox is used to tell your TReK system that your PC is located behind a firewall that is using Network Address Translation. If this is the case you will need to enter your firewall's public IP Address and port number.

Firewall IP Address (Required Field if Firewall In Use is Checked)

The IP address for your firewall.

Firewall Request Port (Required Field if Firewall In Use is Checked)

The port number for your firewall for use with the CDP request socket.

Firewall Data Port (Required Field if Firewall In Use is Checked)

The port number for your firewall for use with the CDP data flow.

Duration (Required Field)

You can specify how long the POIC should send the custom data packets. If you specify Infinite, the packets will be sent until you stop the transmission. If you specify a time, the packets will only be sent for that duration.

Packet Rate (Required Field)

The rate the POIC should send the packets. You can specify that the packet rate be based on the fastest source APID associated with the parameters identified in the packet. Or you can specify a rate in time between packets.

Expected Packet Rate (Required Field If Using Fastest Source)

If you use the “Rate Equivalent to the Fastest Source APID” selection for packet rate, you need to enter an expected packet rate. This should be the rate associated with the fastest source APID.

6.12 Add A CDP Packet (Login Tab) Dialog

The Login tab in the Add A CDP Packet dialog is identical to the Login tab in the Add A POIC Destination dialog in the TReK Command Processing application. The Login Tab, shown in Figure 13, provides a way to identify an ERIS Login session to use with this Custom Data Packet. It is possible to share an ERIS Login session among several Custom Data Packets and one or more commanding sessions. When the Custom Data Packet is activated, it will activate the ERIS Login session if it is inactive or use the active ERIS Login session if it is already active. To add an ERIS Login session to the list, push the Add button. Once an ERIS Login session is in the list, it can be modified using the Modify button. To delete an ERIS Login Session use the Delete button.

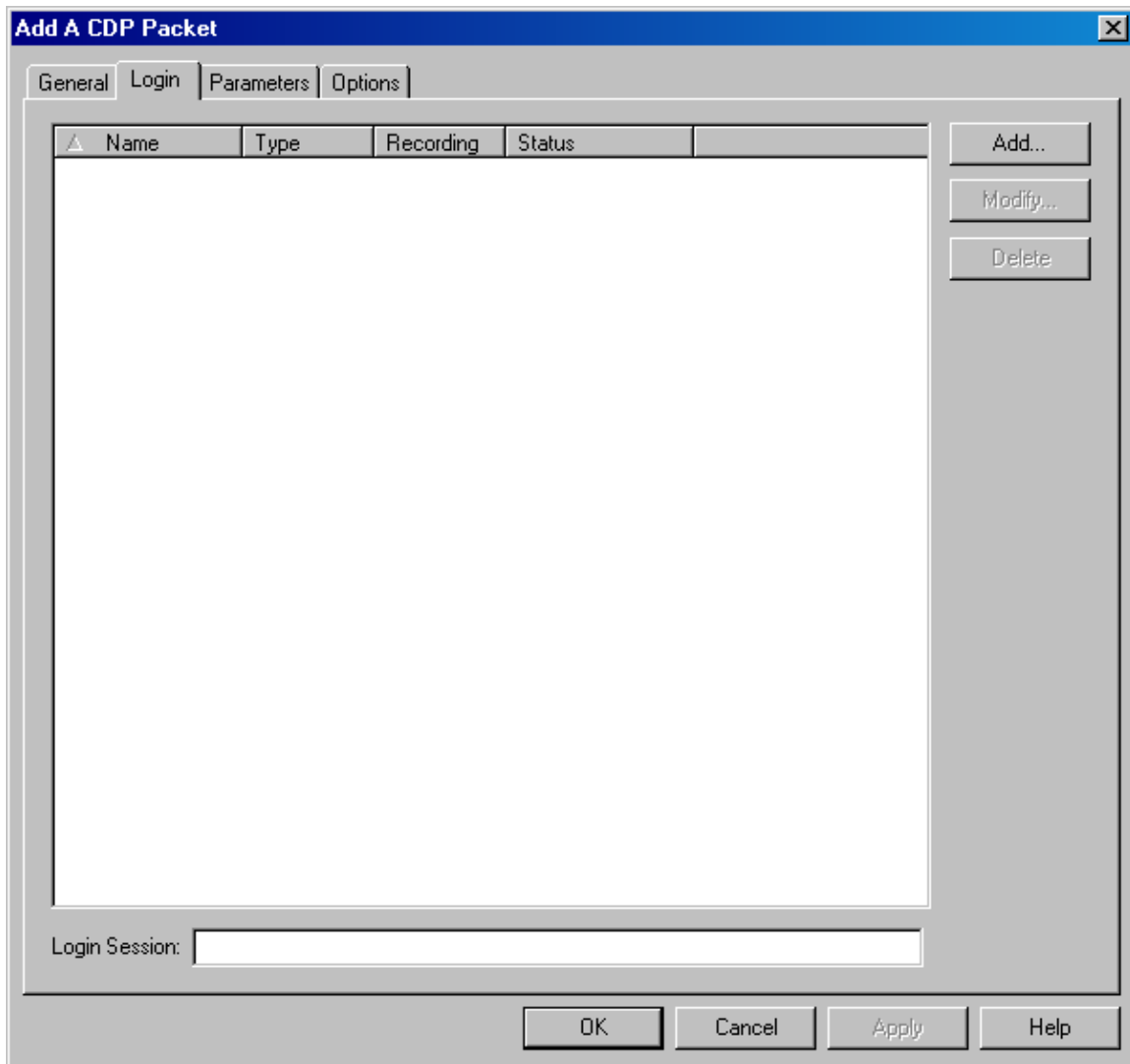


Figure 13 Add A CDP Packet (Login Tab) Dialog

Note: When you select to Modify an ERIS Login Session, the name of the ERIS Login Session cannot be modified (regardless of whether the ERIS Login Session is active or inactive). If you need to change the name, you will need to add a new ERIS Login Session. The old ERIS Login Session will be considered "in use" until you leave the dialog. Therefore, if you want to delete it you need to delete it after you leave this dialog.

Note2: All the ERIS Login Session list changes you make on this tab take place immediately and cannot be cancelled. The only item on this tab that can be cancelled is the ERIS Login Session to be used by this custom data packet. If you push the Cancel button to cancel all the actions taken in the dialog, the ERIS Login Session assignment will be reset but the ERIS Login Sessions added, modified, or deleted will not be cancelled or reset.

6.13 Add ERIS Login Session (General Tab) Dialog

The Add ERIS Login Session dialog is shown in Figure 14. This dialog is used to Add an ERIS Login Session to the ERIS Login Session list in the Login Tab of the Add POIC Destination dialog. It has a General tab and an Options tab.

Figure 14 Add ERIS Login Session (General Tab) Dialog

Each field and control on the Add ERIS Login Session (General Tab) dialog is described below.

Name

This is the name of the ERIS Login Session. This name must be unique among all destinations and login sessions.

POIC Host Name

When entering information needed to establish a connection with the POIC you can enter the POIC Host Name or the POIC IP Address. The POIC Host Name menu lists all the available POIC host names. When you select a host name, the IP Address in the POIC IP Address field will not be updated until the destination is activated.

POIC IP Address

The IP Address to connect to at the POIC.

POIC Port

The Port Number to use when connecting to the POIC. This should be provided to you by the POIC.

Username

The username for your POIC Account. This should be provided to you by the POIC. If you leave this field blank you will be prompted to enter this information when you activate this destination. (During the activation sequence when TReK is establishing a connection with the POIC, ERIS will prompt you to log in to your POIC account).

Password

The password for your POIC Account. This should be provided to you by the POIC. If you save your configuration, the password will not be saved in the configuration file. This has been done for security reasons.

MOP

The Mission/Operational Support Mode/Project (MOP) to log into when you log into your POIC account. If you don't know the MOP then just leave this field blank. If you leave this field blank you will be prompted to select a MOP from a list during the Log In sequence. If you enter a MOP into this field then the application will try to use the MOP you enter and will only prompt you if the MOP you entered is not available. If you log into a POIC account in which there is only one mop available, then the POIC will automatically log you into that MOP. In this case, the POIC does not send a MOP request to TReK.

6.14 Add ERIS Login Session (Options Tab) Dialog

The Add ERIS Login Session Options Tab is shown in Figure 15. This tab is used to configure recording and viewing properties for the ERIS Login Session.

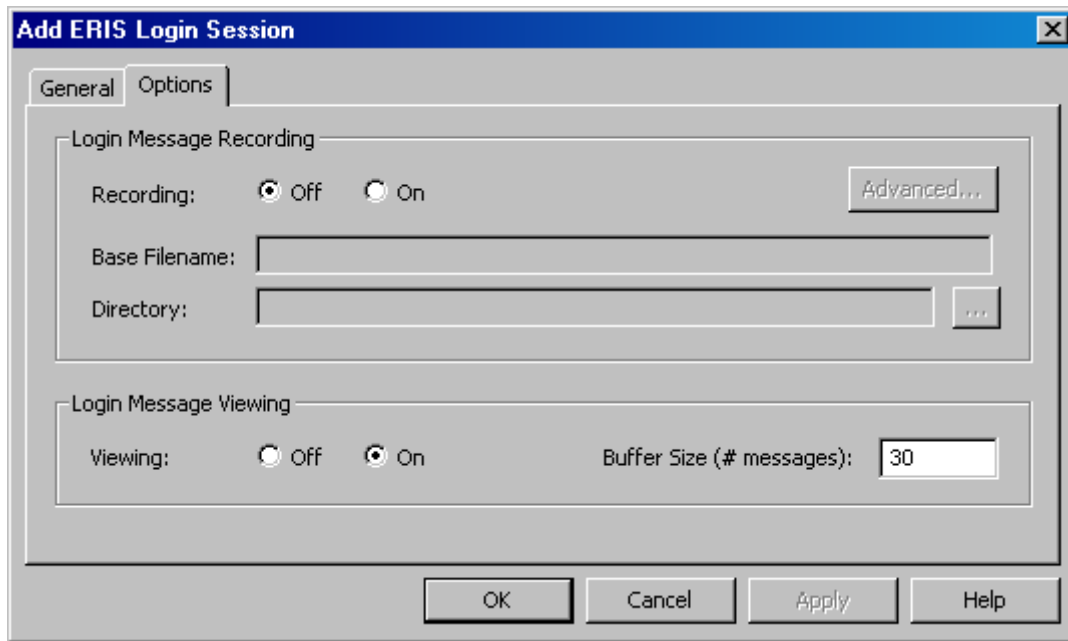


Figure 15 Add ERIS Login Session (Options Tab) Dialog

Each field and control on the Add ERIS Login Session (Options Tab) dialog is described below.

Recording (Required Field)

The Recording option is used to tell your TReK system whether the ERIS Login Session should be recorded. In the main window the recording status for this recording will be labeled “Login Recording”. The Login Recording status is not shown in the default main window configuration. By using the ‘Configure Destination List Columns’ menu option on the View menu you can add this column to the main window list.

Base Filename (Required Field if Recording is On)

When your TReK system records an ERIS Login Session, the raw data is stored in one or more files in a local directory. A base filename (provided by you) is used as the base name of the file and the rest of the file name is generated by your TReK system. The complete filename indicates the time the file was created and closed. When you want to play the data back, you will be asked to provide this Base Filename. Therefore, you should try to select a meaningful name that will be easy to remember and is closely associated with the data that you are recording.

Directory (Required Field if Recording is On)

The Directory information is used to tell your TReK system which directory should be used when storing your data recording files. When you want to play the data back, you will be asked to provide this Directory information so your TReK system can find the files. This field requires a complete directory path. An example of this is

c:\MyRecordingFiles\.. If you don't like to type or you need help defining the complete path, you can push the ... (dot dot dot) button located to the right of the Directory field. This will bring up a Windows Browse for Folder dialog which you can use to identify the local directory path where you want to store your recorded data files. The Browse for Folder dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help.

Viewing (Required Field)

The Viewing option is used to tell your TReK system whether the realtime messages associated with the ERIS Login Session should be available for viewing. Viewing does use CPU and memory resources. Therefore, remember that if you start to run low on resources it is possible to turn viewing off.

Buffer Size (# Messages) (Required if Viewing is On)

The Buffer Size tells your TReK system how many realtime messages to store in memory at a time. The buffer will wrap and older messages will be overwritten. This is a safeguard against using up too much memory.

6.15 Add A CDP Packet (Parameters Tab) Dialog

The Parameters tab is shown in Figure 16. This tab is used to identify the list of parameters you would like to request. You can add parameters to the list manually (one at a time), or you can add parameters to the list using a file.

Note: CDP does not allow a user to request the unprocessed, converted, and calibrated value for a single parameter in the same CDP request. You can make multiple requests to get the data unprocessed, converted, and calibrated if necessary.

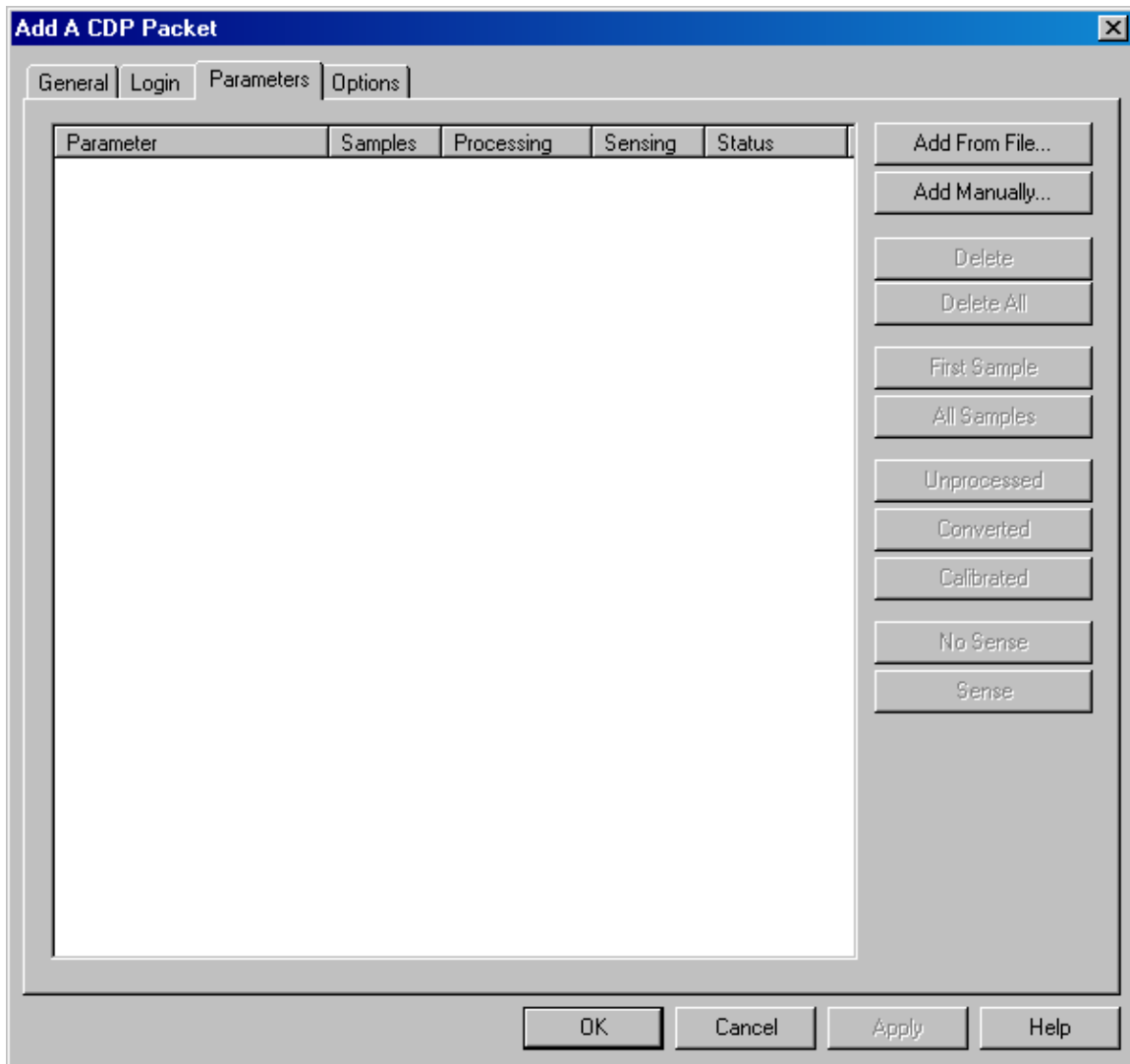


Figure 16 Add A CDP Packet (Parameters Tab) Dialog

Each field and control on the Parameters Tab is described below.

Parameter List

The Parameter list contains 5 columns: Parameter, Samples, Processing, Sensing, and Status. The Parameter column contains the parameter name. The Samples column indicates whether the POIC should send the first sample or all samples. The Processing column indicates whether the value returned should be Unprocessed, Converted, or Calibrated. The Sensing column indicates whether the POIC should perform limit/expected state sensing for the parameter. The Status column will be blank until the packet is activated. The Status column indicates the status of the parameter – whether the parameter could be sent.

Note: Multiple parameters can be selected by holding down the shift key while selecting items.

Add From File

The Add From File button displays the Add From File dialog. This dialog is described in section 6.18.

Add Manually

The Add Manually button displays the Add Parameter Manually dialog. This dialog is described in 6.17.

Delete

The Delete button deletes all the selected parameters.

Delete All

The Delete All button deletes all parameters in the list.

First Sample

The First Sample button will update the Samples property for all selected parameters to “First”. First Sample indicates that you only want the first sample of the parameter.

All Samples

The All Sample button will update the Samples property for all selected parameters to “All”. All indicates that you want all the samples of the parameter.

Unprocessed

The Unprocessed button will update the Processing property for all selected parameters to “Unprocessed”. Unprocessed indicates that you want to receive the unprocessed value of the parameter.

Converted

The Converted button will update the Processing property for all selected parameters to “Converted”. Converted indicates that you want to receive the converted value of the parameter.

Calibrated

The Calibrated button will update the Processing property for all selected parameters to “Calibrated”. Calibrated indicates that you want to receive the calibrated value of the parameter.

No Sense

The No Sense button will update the Sensing property for all selected parameters to “No Sense”. No Sense indicates that you do not want any limit/expected state sensing performed for the parameter.

Sense

The Sense button will update the Sensing property for all selected parameters to “Sense”. Sense indicates that you want limit/expected state sensing performed for the parameter.

6.16 Add A CDP Packet (Options Tab) Dialog

The Options tab shown is shown in Figure 17. This tab is used to identify preferences for packet recording, packet forwarding, packet viewing, and packet statistics recording.

Add A CDP Packet

General | Login | Parameters | **Options**

Packet Recording

Recording: ☒ Off ☐ On Advanced...

Base Filename:

Directory: ...

Packet Forwarding

Forwarding: ☒ Off ☐ On Define Forwarding List...

Packet Viewing

Viewing: ☒ Off ☐ On Buffer Size (# Packets):

Packet Statistics Recording

Statistics Recording: ☒ Off ☐ On

Base Filename:

Directory: ...

OK Cancel Apply Help

Figure 17 Add A CDP Packet (Options Tab) Dialog

Each field on the Options Tab of the Add A CDP Packet dialog is described below.

Recording (Required Field)

The Recording option is used to tell your TReK system whether the packet should be recorded. Please be aware that recording data can take up a large amount of disk space. Make sure you have enough space to hold all the data recording files. The Advanced Recording features that are available when you push the “Advanced” button are described in section 6.33.

Base Filename (Required Field if Recording is On)

When your TReK system records a packet, the raw packet data is stored in one or more files in a local directory. A base filename (provided by you) is used as the base name of the file and the rest of the file name is generated by your TReK system. The complete filename indicates the time the file was created and closed. When you want to play the data back, you will be asked to provide this Base Filename. Therefore, you should try to select a meaningful name that will be easy to remember and is closely associated with the data that you are recording.

Directory (Required Field if Recording is On)

The Directory information is used to tell your TReK system which directory should be used when storing your data recording files. When you want to play the data back, you will be asked to provide this Directory information so your TReK system can find the files. This field requires a complete directory path. An example of this is `c:\MyRecordingFiles\.` If you don’t like to type or you need help defining the complete path, you can push the ... (dot dot dot) button located to the right of the Directory field. This will bring up a Windows Browse for Folder dialog which you can use to identify the local directory path where you want to store your recorded data files. The Browse for Folder dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help.

Forwarding (Required Field)

The Forwarding option is used to tell your TReK system whether the packets received should be forwarded. If you turn forwarding on you should use the “Define Forwarding List” button to access the Define Forwarding List dialog box where you can enter the forwarding information. The Define Forwarding List dialog is described in section 6.28.

Viewing (Required Field)

The Viewing option is used to tell your TReK system whether the incoming packets should be available for viewing. Viewing does use CPU and memory resources so if you don’t need to view the packets leave viewing off. Packet viewing is most useful as a diagnostic tool. The View Packets dialog can be seen in Figure 38.

Buffer Size (# Messages) (Required if Viewing is On)

The Buffer Size tells your TReK system how many packets to store in memory at a time. The buffer will wrap and older packets will be overwritten. This is a safeguard against using up too much memory. This buffer is only associated with viewing. Therefore,

setting the size of this buffer will not affect the TReK Queues (buffers) that are used to store incoming packets for processing, recording, etc.

Statistics Recording (Required Field)

The Statistics Recording option is used to tell your TReK system whether packet statistics should be recorded. You can always view the statistics information using the Telemetry Processing Statistics dialog. However, you can also record the statistics information. The statistics information is stored in a Microsoft Excel file which can be viewed using the Microsoft Excel product.

Base Filename (Required Field if Statistics Recording is On)

When your TReK system records packet statistics, the statistics are stored in an excel file in a local directory. A base filename (provided by you) is used as the base name of the file and the rest of the file name is generated by your TReK system. The complete filename indicates the time the file was created and closed.

Directory (Required Field if Statistics Recording is On)

The Directory information is used to tell your TReK system which directory should be used when storing your statistics file. This field requires a complete directory path. An example of this is `c:\MyRecordingFiles\`. If you don't like to type or you need help defining the complete path, you can push the ... (dot dot dot) button located to the right of the Directory field. This will bring up a Windows Browse for Folder dialog which you can use to identify the local directory path where you want to store your recorded data files. The Browse for Folder dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help.

6.17 Add Parameter Manually Dialog

The Add Parameter Manually dialog is shown in Figure 18. This dialog is used to add a parameter to the parameter list on the Add A CDP Packet Parameters Tab.

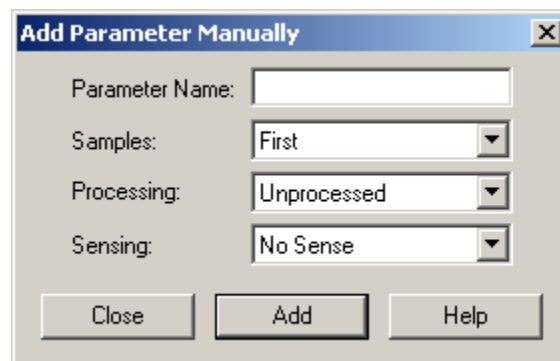


Figure 18 Add Parameter Manually Dialog

Each field in the Add Parameter Manually dialog is described below.

Parameter Name (Required Field)

The Parameter Name is the name of the parameter that you would like the POIC to place in the custom data packet.

Samples (Required Field)

The Samples menu provides a way to indicate whether you would like the first sample or all samples.

Processing (Required Field)

The Processing menu provides a way to indicate whether you would like the POIC to send the parameter unprocessed, converted, or calibrated.

Sensing (Required Field)

The Sensing menu provides a way to indicate whether you would like the POIC to sense the parameter. No Sense indicates that no limit/expected state sensing should be performed while the Sense option indicates that limit/expected state sensing should be performed.

Buttons

Close

The Close button closes the dialog. This is the only function that it performs. It does not add any information entered into the dialog into the Parameter list.

Add

The Add button is used to add the parameter information to the list. When you push the Add button the information will be added to the parameter list and the dialog will remain on the screen.

6.18 Add From File Dialog

The Add From File dialog is shown in Figure 19. This dialog is used to identify a file that contains information about one or more parameters to be added to the parameter list on the Add A CDP Packet Parameters Tab. The CDP Parameters Input File format is described in Appendix C of this document.

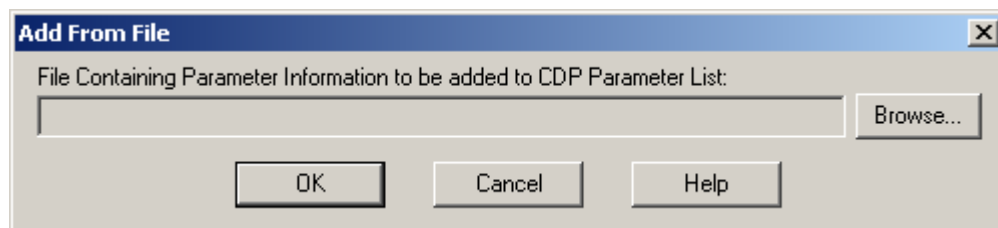


Figure 19 Add From File Dialog

Each field in the Add From File dialog is described below.

File Containing Parameter Information to be added to CDP Parameter List (Required Field)

The complete path for the file containing the CDP parameter information must be entered into this field. The Browse button is used to select the file.

6.19 CDP Database File Exists Warning Message Dialog

Each time you activate a CDP packet, a new Telemetry Database will be generated. If the TReK Database information you entered on the General tab of the Add A CDP Packet dialog corresponds to a file that already exists, the dialog shown in Figure 20 will be displayed. You can either select Yes to delete the existing file and continue the activation or you can select No to cancel the activation.

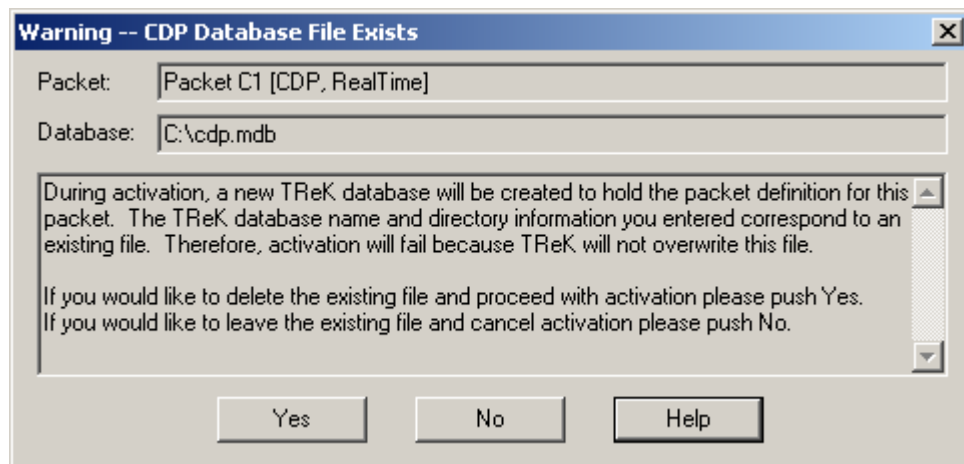


Figure 20 CDP Database File Exists Warning Message Dialog

6.20 Add A Playback Packet (General Tab) Dialog

The Add A Playback Packet dialog is used to add local TReK playback packets to the packet list in the main window. This is how you configure and run a local TReK playback. For playback packets that are being sent from an external data source (such as the POIC) use the Add A Packet dialog. As can be seen in Figure 21, there are three tabs in the Add A Playback Packet dialog. The General tab is used to configure playback properties such as data mode, playback type, and playback rate.

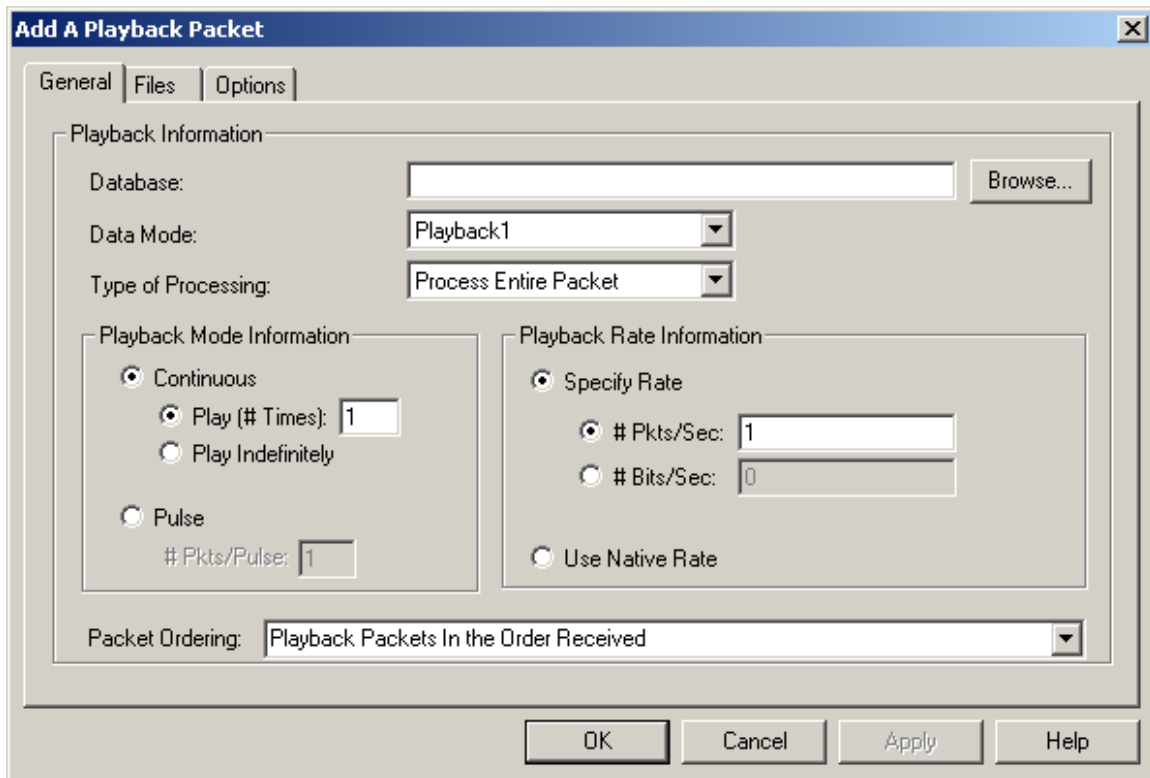


Figure 21 Add A Playback Packet (General Tab) Dialog

Each field on the General Tab of the Add A Playback Packet dialog is described below.

Database (Required Field)

The database field is used to tell your TReK system which database to use when handling (processing, limit/expected state sensing) your playback packet and the parameters inside the packet. The database field must contain the complete directory path and name for your database. An example of this is `c:\TReK\database\TelemetryDatabase.mdb`. If you don't know the complete path, you can push the Browse... button located to the right of the Database field. This will bring up a Windows Open dialog box that you can use to search local directories to find your database file. The Open dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help. The Open dialog will default to the `<base_path>\database` directory. The `<base_path>` on a Windows 2000 computer is shown below.

`<base_path> = C:\Documents and Settings\<username>\Application Data\TReK`

You can save your database files anywhere you like, but this default directory provides an easy way for you to keep up with your database files.

Data Mode (Required Field)

The Data Mode field is used to tell your TReK system what type of data mode should be associated with your playback packet. Normally you will use one of the 11 playback data modes when playing back recorded data. However, it is possible to use the Realtime data mode or one of the Dump data modes. The None data mode should only be used when playing back Suitcase Simulator data. It should never be used when playing data back that was originally received from the POIC. Since Suitcase Simulator packets are CCSDS packets and do not have an EHS header, they do not have a data mode.

Type of Processing (Required Field)

The Type of Processing field is used to tell your TReK system what type of processing should be performed when the packet arrives. The choices for Type of Processing are as follows:

Process Entire Packet

If you choose Process Entire Packet, this means that the packet should be processed and all the individual parameters that make up the packet should be extracted. By choosing this option, you will have access to all the individual parameters in the packet through the TReK Application Programming Interface (API). This is the default for Type of Processing. Please see the TReK Telemetry Application Programming Interface Reference Manual (TREK-USER-027) for more information about how you can access this data. For more information on this processing type please see the TReK Processing Types (TREK-USER-016) white paper.

Process Selected Parameters

Each parameter in a TReK telemetry database has a Process Flag associated with it. Please see the TReK Telemetry Database User Guide (TREK-USER-005) for information about the Process Flag. The Process Flag is located in the Node table and it indicates whether the parameter should be processed. If you choose Process Selected Parameters, this means that all the parameters in the packet that have the Process Flag set to 'Y' should be processed. These are the only parameters in the packet that will be processed. For more information on this processing type please see the TReK Processing Types (TREK-USER-016) white paper.

Process On Request Hybrid

If you choose Process On Request Hybrid this means that parameters that have the Process Flag set to 'Y' should be processed, and the other parameters in the packet should only be processed upon request. The Process Flag is only used to establish the initial set of parameters to be processed. Other parameters will be processed upon request regardless of the state of the Process Flag. For more information on this processing type please see the TReK Processing Types (TREK-USER-016) white paper.

Process On Request Only

If you choose Process On Request Only, TReK will initially only process measurements in the packet headers (EHS header and CCSDS header). However, if you start a user

product, such as a Visual C++ program, that requests one or more parameters through the TReK User API, then these parameters will be added to the processing list. This is why this option is called Process On Request. Parameters are only processed when you request that they be processed. The request for processing services is made indirectly by making a User API call to retrieve the parameter. Once you make a request for a parameter, this parameter will continue to be processed as long as the packet is active. For more information on this processing type please see the TReK Processing Types (TREK-USER-016) white paper.

Pass-Thru

If you choose Pass-Thru, the CCSDS portion of the packet will be extracted, but the packet will not be processed. This means that you can use the TReK API to retrieve the EHS, CCSDS, or data zone portions of the packet, but not any of the individual parameters in the data zone of the packet. Please note that if you are using the Pass-Thru capability the APID for your packet must be defined in the database. Please see the TReK Telemetry Database User Guide (TREK-USER-005) for information about adding data to the database.

Off

If you choose Off, this indicates that you don't want to process or pass-thru the packet. This is something you might do if you want to record the packet or forward the packet, but you are not interested in having it processed in any way.

These options are described in more detail in the TReK Telemetry Tutorial (TREK-USER-002) and the TReK Processing Types white paper (TREK-USER-016).

Continuous (Must Select Either Continuous or Pulse)

The Continuous radio button provides a way to indicate that you want the playback to run continuously. In Continuous Mode the data will be played back until there is no more data or you push the Stop Playback button. You can specify the number of times to play the recorded data segment or to loop indefinitely.

Pulse (Must Select Either Continuous or Pulse)

The Pulse radio button provides a way to indicate that you want to push the Pulse button to control the playback of data. If you select the pulse radio button, you must enter information in the “# Pkts/Pulse” field to identify how many packets to playback when the pulse button is pushed.

Pkts/Pulse Field (Required if Pulse has been Selected)

The # Pkts/Pulse field can be used with pulse mode and provides a way to identify how many packets to playback when the pulse button is pushed.

Specify Rate Field (Must Select Either Specify Rate or Native Rate)

The Specify Rate field provides a way to identify a specific rate for the playback. You can enter the rate information in packets per second or bits per second. This information is used to tell your TReK system how much data to transmit when playing back the

packets. It can be used with Continuous mode or Pulse mode. Note, the operating system's timing precision is limited to 1/100th of a second. Therefore, to achieve packet rates greater than 100 packets per second, the Telemetry Processing application must transmit packets in groups. This "bursting" implementation can create inaccuracies between the number of packets that were expected to be sent and the actual number of packets that were sent.

Native Rate Field (Must Select Either Specify Rate or Native Rate)

Native Rate provides a way to identify that the packet's native rate should be used for the playback. It can be used with Continuous mode or Pulse mode. Native rate is determined by the time stamp associated with each packet. If you select Native Rate, you must enter a Maximum Expected Packet Rate.

Maximum Expected Packet Rate (Required Field if Native Rate has been Selected)

The Maximum Expected Packet Rate should indicate the maximum number of packets you expect to arrive per second.

Packet Ordering (Required Field)

Packet Ordering identifies the ordering that TReK should use for the playback. For example, you can select to playback the data in the order it was received, playback the data after it has been reordered based on time, or playback the data after it has been reordered based on time and all duplicates have been removed. Duplicates can occur if you have identified multiple sets of recorded data that overlap in time. This can occur if you are working with recording files that contain both realtime data and dump data. There may be some timeframe in which the same packets were recorded in both sets of recording files. In this situation you may want to identify both sets of recording files in order to merge them together into one contiguous time frame, but you want to remove any duplicates that were the result of the time overlap.

6.21 Add A Playback Packet (Files Tab) Dialog

The Files Tab, shown in Figure 22, provides a way to identify the recorded data files that should be used for the playback. You can only playback one type of data at a time. For example, you cannot identify recording files that contain PDSS Payload data and recording files that contain GSE data. If you identify more than one set of recording files, they must contain the same type of data. You can identify recording files that contain data that was recorded with different data modes. For example, this would occur if you wanted to merge data that was recorded as realtime data with data that was recorded as dump data.

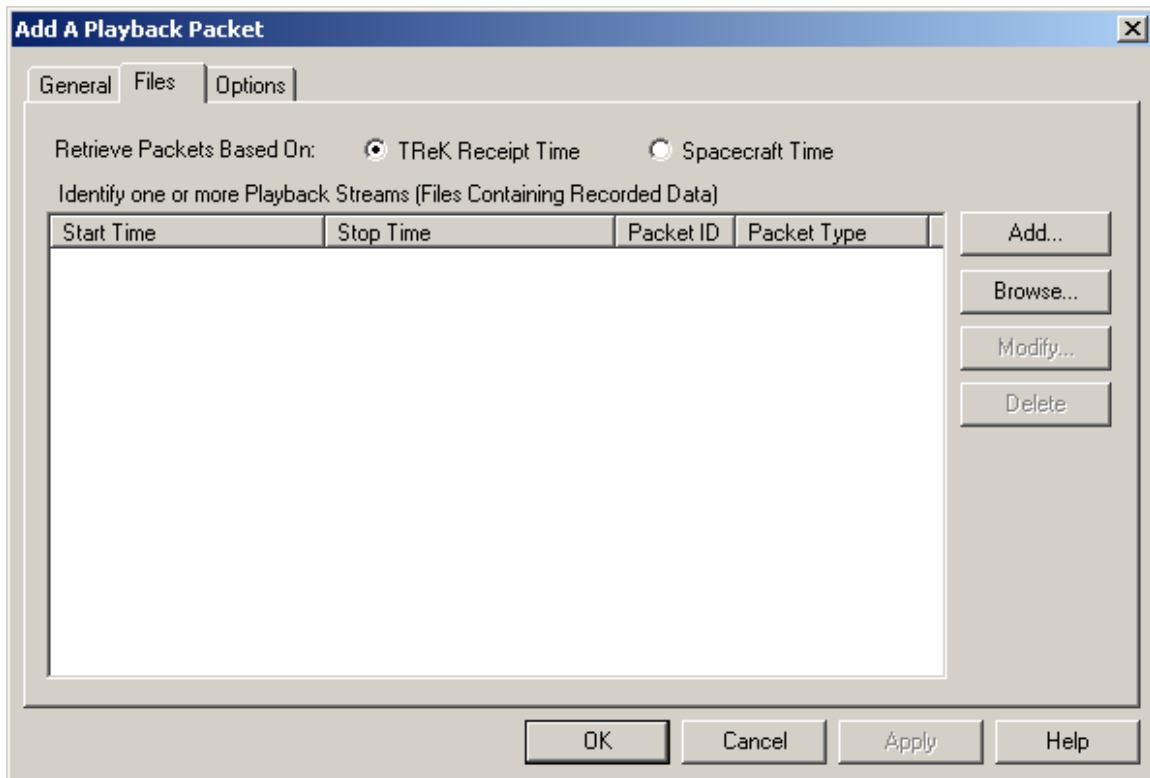


Figure 22 Add A Playback Packet (Files Tab) Dialog

Each field on the Files Tab of the Add A Playback Packet dialog is described below.

Retrieve Packets Based On (Required Field for Telemetry Data)

This option tells your TReK system whether to use TReK Receipt Time or Spacecraft Time when telemetry packets are retrieved from the data recording files for viewing. Spacecraft Time refers to the Embedded Time that is located in the CCSDS secondary header of PDSS Payload packets and Suitcase Simulator packets. Spacecraft Time cannot be used with PDSS UDSM packets or GSE packets.

Playback Stream List (Required Field)

This playback stream list displays each set of recording files that you have identified. For each set of recording files, the entry will show the Start Time, Stop Time, Packet ID, and Packet Type associated with those recording files.

Buttons

Add

The Add button is used to access the Add dialog to identify one set of recording files to be added to the playback stream list. The Add dialog is described in section 6.22.

Browse

The Browse button is used to access the Windows Open dialog to identify one or more recording files to add to the playback stream list.

Modify

The Modify button is used to modify an entry in the list. The Modify dialog is identical (except for the title) to the Add dialog described in section 6.22.

Delete

The Delete button is used to delete an item in the playback stream list.

6.22 Add (Playback Stream) Dialog

The Add dialog is shown in Figure 23. This dialog provides a way to identify one set of recording files to be added to the Playback Stream List.

	Year	Month	Day	Hour	Min	Sec	msec
Start Time:	2002	4	10	15	1	55	0
Stop Time:	2002	4	10	15	1	55	0
Original Base Filename:	<input type="text"/>						
Original Recorded Data Directory:	<input type="text"/> ...						

OK Cancel Help

Figure 23 Add (Playback Stream) Dialog

Each field in the Add dialog is described below.

Start Time (Required Field)

The Start Time information tells your TReK system where to start the playback. You can choose to start the playback at any location within the time span associated with the recorded data. The start time does not have to be an exact match with the start time on any of the files. It can be any time before or after the start time on the first file.

Stop Time (Required Field)

The Stop Time information tells your TReK system where to stop the playback. You can choose to stop the playback at any location within the time span associated with the recorded data. The stop time does not have to be an exact match with the stop time on any of the files. It can be any time after the start time on the first file.

Original Base Filename (Required Field)

The Original Base Filename field is used to tell your TReK system the Base Filename you used when you originally recorded the data. Be sure to enter exactly what you entered when you originally recorded the data. For example, if you used the name “packet7” for the Base Filename when you recorded the data, then you should enter “packet7” in the Original Base Filename field. (Note: File extensions are not required but they are allowed.)

Original Recorded Data Directory (Required Field)

The Original Recorded Data Directory field is used to tell your TReK system where the original data recording files are stored. This field requires a complete directory path. An example of this is C:\MyRecordingFiles\. If you don't like to type or you need help defining the complete path, you can push the ... (dot dot dot) button located to the right of the Original Recorded Data Directory field. This will bring up a Windows Browse for Folder dialog which you can use to identify the local directory path where your recorded data files are stored. The Browse for Folder dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help.

6.23 Add A Playback Packet (Options Tab) Dialog

The Options Tab, shown in Figure 24, provides a way to configure optional playback packet services. The Options tab is divided into three sections: Packet Recording, Packet Forwarding, and Packet Viewing. The Packet Recording section is used to identify whether the playback packets should be recorded. Though it may seem strange to record packets that you have already recorded, you might want to do this to narrow down a particular data segment. The Packet Forwarding section provides a way for you to indicate whether the playback packets should be forwarded to another system. You can identify that the playback packets should not be forwarded or that the playback packets should be forwarded to one or more external machines. The Packet Viewing section is used to configure playback packet viewing. This is how you identify how many playback packets should be displayed when you push the Pulse button in the View Packets dialog. If you turn packet viewing off, you will still be able to bring up the View Packets dialog, but no packets will be displayed when you push the Pulse button in the View Packets dialog.

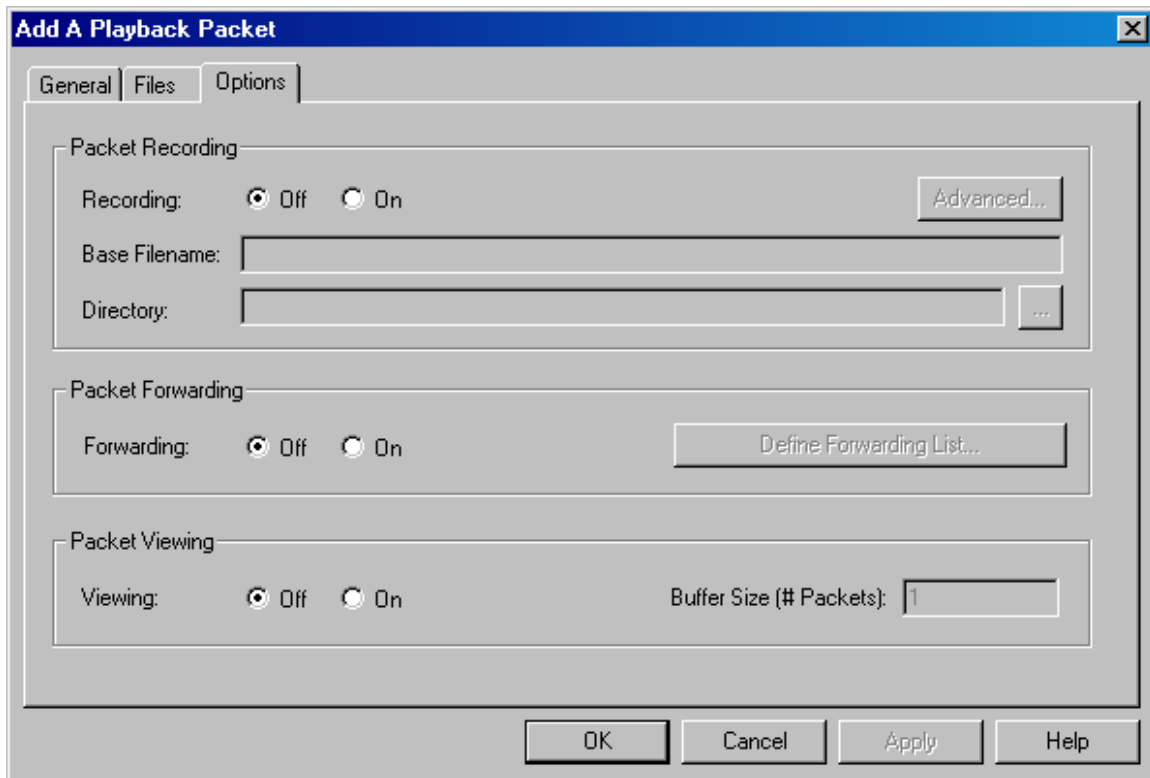


Figure 24 Add A Playback Packet (Options Tab) Dialog

Each field on the Options Tab of the Add A Playback Packet dialog is described below.

Recording (Required Field)

The Recording option is used to tell your TReK system whether the playback packet should be recorded. Please be aware that recording data can take up a large amount of disk space. Make sure you have enough space to hold all the data recording files. The Advanced Recording features that are available when you push the “Advanced” button are described in section 6.33.

Base Filename (Required Field if Recording is On)

When your TReK system records a packet, the raw packet data is stored in one or more files in a local directory. A base filename (provided by you) is used as the base name of the file and the rest of the file name is generated by your TReK system. The complete filename indicates the time the file was created and closed. When you want to play the data back, you will be asked to provide this Base Filename. Therefore, you should try to select a meaningful name that will be easy to remember and is closely associated with the data that you are recording.

Directory (Required Field if Recording is On)

The Directory information is used to tell your TReK system which directory should be used when storing your data recording files. When you want to play the data back, you

will be asked to provide this Directory information so your TReK system can find the files. This field requires a complete directory path. An example of this is `c:\MyRecordingFiles\.` If you don't like to type or you need help defining the complete path, you can push the ... (dot dot dot) button located to the right of the Directory field. This will bring up a Windows Browse for Folder dialog which you can use to identify the local directory path where you want to store your recorded data files. The Browse for Folder dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help.

Forwarding (Required Field)

The Forwarding option is used to tell your TReK system whether the playback packets should be forwarded. If you turn forwarding on you should use the "Define Forwarding List" button to access the Define Forwarding List dialog box where you can enter the forwarding information. The Define Forwarding List dialog is described in section 6.28.

Viewing (Required Field)

The Viewing option is used to tell your TReK system whether the playback packets should be available for viewing. Viewing does use CPU and memory resources so if you don't need to view the packets leave viewing off. Packet viewing is most useful as a diagnostic tool. Please note that the Recorded Data Viewer (available from the Options menu) can also be used to view data stored in TReK recording files. The Recorded Data Viewer can be used to view any TReK recording files. The viewing option being described here is only associated with the playback packet you are configuring with this dialog to be added to the main window packet list. It is used to control what happens when you select this playback packet in the main window packet list and display the View Packets window. The View Packets dialog can be seen in Figure 38.

Buffer Size (# Messages) (Required if Viewing is On)

The Buffer Size tells your TReK system how many packets to store in memory at a time. The buffer will wrap and older packets will be overwritten. This is a safeguard against using up too much memory. This buffer is only associated with viewing the packets associated with this playback.

6.24 Browse Database Dialog

The Browse Database dialog is shown in Figure 25. This dialog is used to search a TReK database for a Packet ID.

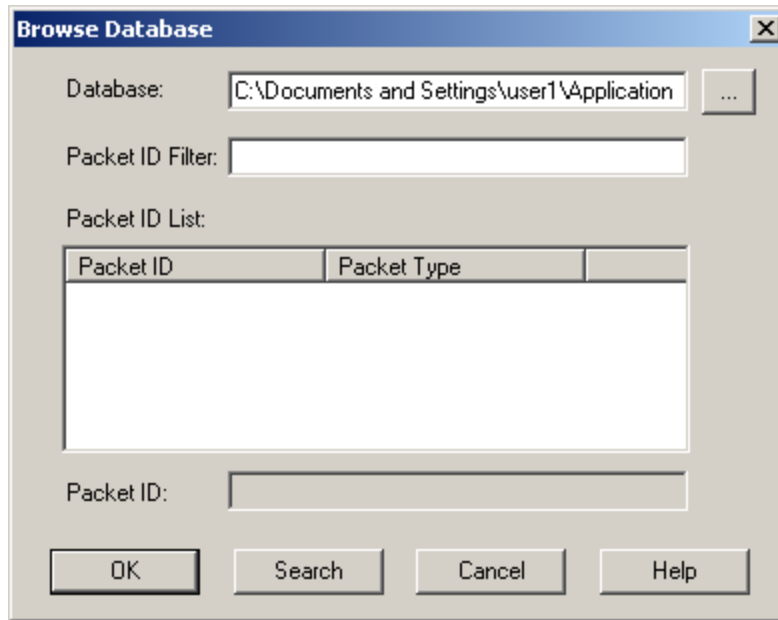


Figure 25 Browse Database Dialog

Each field in the Browse Database dialog is described below.

Database (Required Field)

The database field is used to tell your TReK system which database to search. The database field must contain the complete directory path and name for the database. An example of this is `c:\TReK\database\TelemetryDatabase.mdb`. If you don't know the complete path, you can push the ... (dot dot dot) button located to the right of the Database field. This will bring up a Windows Open dialog box which you can use to search local directories to find your database file. The Open dialog will default to the `<base_path>\database` directory. The `<base_path>` on a Windows 2000 computer is shown below.

`<base_path> = C:\Documents and Settings\<username>\Application Data\TReK`

Packet ID Filter (Optional Field)

If you do not fill in the Packet ID Filter field, the search will return all packet IDs in the database. You can use a * wildcard to represent zero or more characters when specifying the filter or a ? to represent any single character. For example, the following filters are valid: `12*`, `1*3`, `*12`, `1??`. The `12*` filter indicates that all Packet IDs that begin with 12 should be returned. The `1*3` filter indicates that all Packet IDs that begin with 1 and end with 3 and have any number of characters in between should be returned. The `*12` filter indicates that all Packet IDs that end in 12 should be returned. The `1??` filter indicates that all Packet IDs that begin with 1 followed by exactly two more characters should be returned.

Packet ID List

This list shows all the Packet IDs returned as a result of the search. There are two columns of information. The column on the left shows the Packet ID and the column on the right shows the packet type. You can sort the list based on either Packet ID or Packet Type. To sort the list by Packet ID, use your mouse to left click on the column header labeled Packet ID. To sort the list by Packet Type, use your mouse to left click on the column header labeled Packet Type. When you click on a column header you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

Packet ID

The Packet ID field is filled in when you select a Packet ID in the list. The Packet ID will be copied to the dialog box that contained the button you used to bring up the Browse Database dialog.

Dialog Buttons

There is one non-standard button on the Browse Database dialog box. It is described below.

Search

The Search button executes the database search based on the criteria you have entered in the Database and Packet ID Filter fields.

6.25 Browse For IP Address Dialog

The Browse For IP Address dialog is shown in Figure 26. This dialog is used to search a TReK system for all IP addresses or network cards associated with the system.

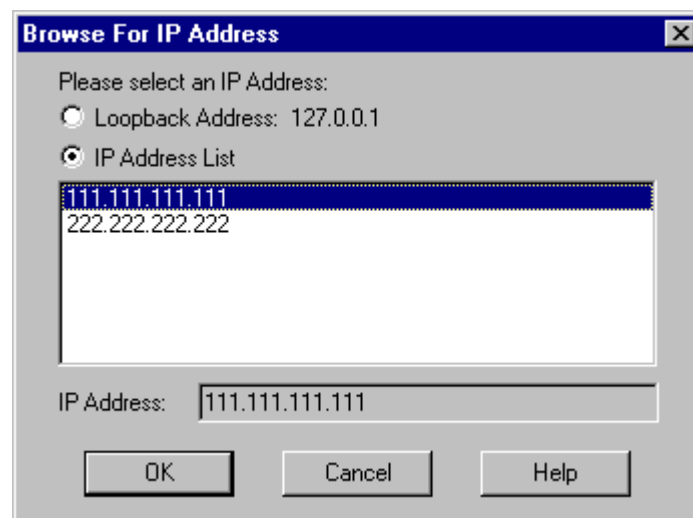


Figure 26 Browse For IP Address Dialog

Each field in the Browse For IP Address dialog is described below.

Please select an IP Address: (Required Field)

You have two options when choosing an IP address. If your TReK system does not have network connectivity (such as no ethernet card or modem or the system is not connected to a network), you need to use the standard loopback address (127.0.0.1). This option is provided by choosing the “*Loopback Address: 127.0.0.1*” radio button. Users with one or more network cards will need to choose which network card or IP Address they would like to use. Choosing the “*IP Address List*” radio button provides this option. The user must then select an IP address from the list.

IP Address

The IP Address field is filled in when you select the Loopback IP address or an IP Address in the list. The IP Address will be copied to the dialog box that contained the button you used to bring up the Browse For IP Address dialog.

6.26 Join Multicast Address Groups Dialog

The Join Multicast Address Groups dialog is shown in Figure 27. This dialog is used to join a multicast address group. If your packets are being sent to a multicast address you need to join the multicast address group. The list shows all the multicast address groups that you have joined. To add an address to the list push the Add button. This will display the Add Multicast Address dialog shown in Figure 28. To delete an address from the list push the Delete button. The Delete button will only be available when an address in the list is selected.

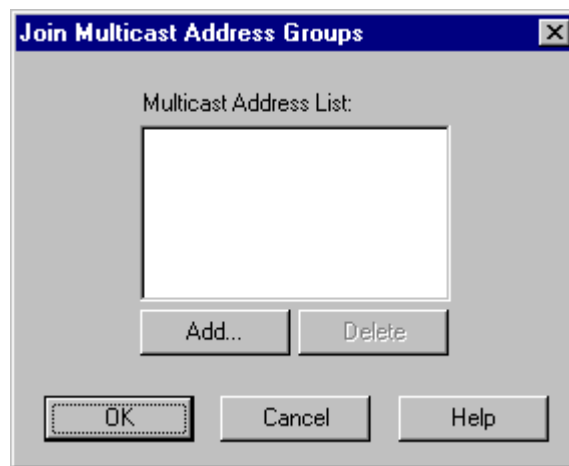


Figure 27 Join Multicast Address Groups Dialog

6.27 Add Multicast Address Dialog

The Add Multicast Address dialog is shown in Figure 28. This dialog is used to add a multicast address to the multicast address list in the Join Multicast Address Groups dialog box.

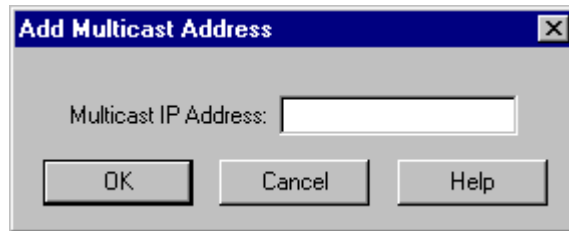


Figure 28 Add Multicast Address Dialog

Each field in the Add Multicast Address dialog is described below.

Multicast IP Address (Required Field)

The Multicast IP Address. This must be a multicast IP address.

6.28 Define Forwarding List Dialog

The Define Forwarding List dialog is shown in Figure 29. This dialog is used to define a forwarding list. Packets can be forwarded to network addresses and to various devices (such as the COM1 port on your computer). There are three tabs on the forwarding list: Network Destinations, Device Destinations, and All Destinations. The Network Destinations tab shows all the network destinations. The Device Destinations tab shows all the device destinations. The All Destinations tab shows the entire forwarding list which is comprised of both network destinations and device destinations. The Network Destinations tab and the Device Destinations tab both contain Add, Modify, and Delete buttons. These buttons are used to Add, Modify, and Delete the corresponding type of destination to the list. For example, if you are on the Network Destinations tab, pushing the Add button will display the Add Forwarding Address dialog. If you are on the Device Destinations tab, pushing the Add button will display the Add Device Destination dialog. To modify a destination in the list, select the destination and then push the Modify button. The Modify button will only be available when a destination in the list is selected. To delete a destination from the list select the destination and then push the Delete button. The Delete button will only be available when a destination in the list is selected. The All Destinations tab does not contain the Add, Modify, and Delete buttons. To make changes to the destination list, use the Network Destinations and Device Destinations tabs.

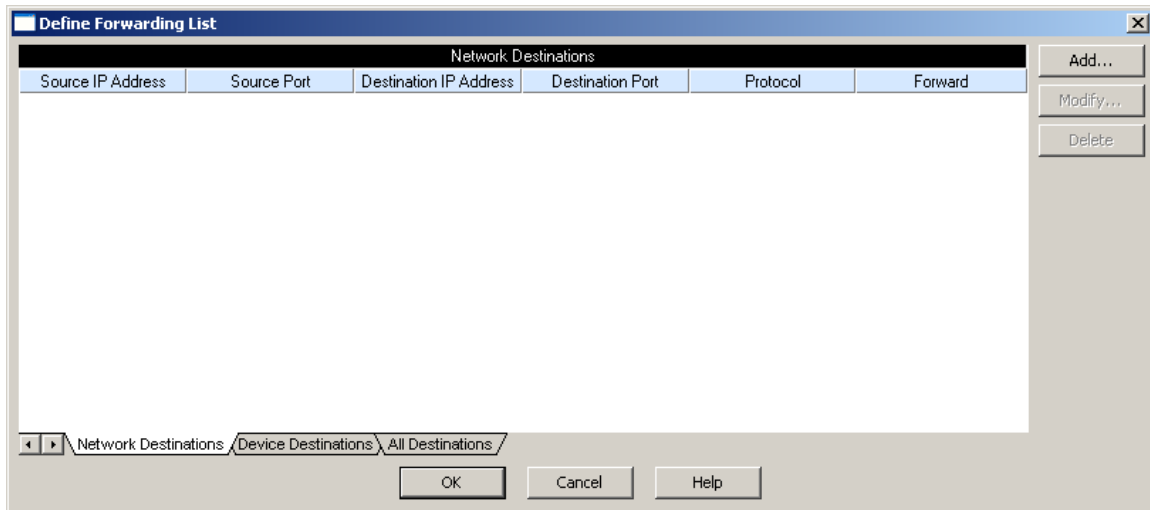


Figure 29 Define Forwarding List Dialog

6.29 Add Forwarding Address Dialog

The Add Forwarding Address dialog is shown in Figure 30. This dialog is used to add a forwarding address to the list of forwarding addresses in the Define Forwarding Address List dialog.

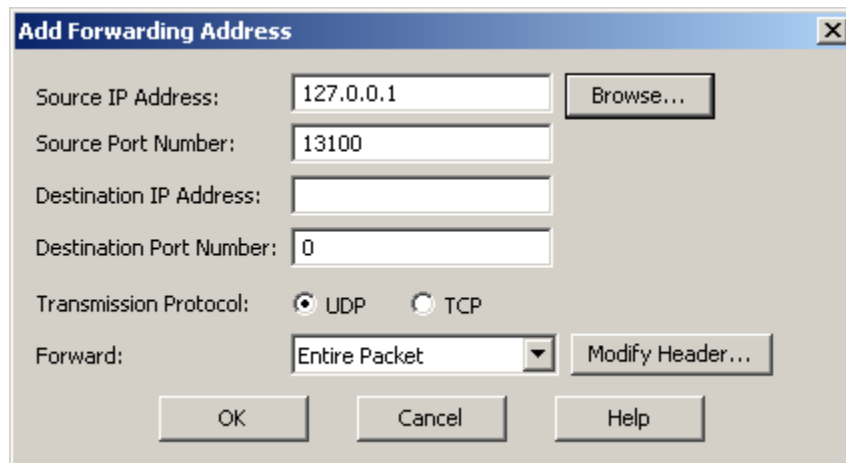


Figure 30 Add Forwarding Address Dialog

Each field in the Add Forwarding Address dialog is described below.

Source IP Address (Required Field)

The Source IP Address must be a unicast IP address and must correspond to a network card that is installed in your computer. The Browse button displays the Browse for IP Address dialog. You can use this dialog to select a Source IP Address. This dialog

contains a list of the IP addresses corresponding to the network cards installed in your computer.

Source Port Number (Required Field)

The Source Port Number.

Destination IP Address (Required Field)

The Destination IP Address. This can be a unicast IP address or a multicast IP address.

Destination Port Number (Required Field)

The Destination Port Number.

Transmission Protocol (Selection Required)

The transmission protocol identifies whether the data should be forwarded using the User Datagram Protocol (UDP) or the Transmission Control Protocol (TCP).

Forward (Selection Required)

The Forward option menu provides a way to identify which portion of the packet to forward. Headers may be added or removed. Options include Entire Packet, EHS Packet, CCSDS Packet, and Data Zone. The packet forwarded is determined by the combination of the incoming packet and the option selected. For example, if the incoming packet is an EHS packet and you choose to forward a CCSDS Packet, then the EHS header will be deleted and the remaining portion of the packet (CCSDS header + Data Zone) will be forwarded. If the incoming packet is a CCSDS packet and you choose to forward an EHS Packet, then an EHS header will be added to the packet before it is forwarded. In some cases these selections will forward the same packet content. For example, a PRCU packet is comprised of a CCSDS header and a data zone. A PRCU packet does not have an EHS header. Therefore, selecting either Entire Packet or CCSDS Packet will forward the same packet content. The table below shows the results of various combinations of incoming packets and options.

Incoming Packet	Option Selected	Packet Forwarded
EHS Packet	EHS Packet	EHS Packet
EHS Packet	Entire Packet	EHS Packet
EHS Packet	CCSDS Packet	CCSDS Packet (EHS header is removed)
CCSDS Packet	EHS Packet	EHS Packet (EHS header is added)
CCSDS Packet	Data Zone	Data Zone (CCSDS header is removed)
CCSDS Packet	Entire Packet	CCSDS Packet
EHS Packet	Data Zone	Data Zone (EHS and CCSDS headers are removed)
PRCU Packet	Entire Packet	PRCU Packet (CCSDS header and data zone)
PRCU Packet	CCSDS Packet	PRCU Packet (CCSDS header and data zone)

When an EHS header is added it consists of a Primary EHS Protocol Header and a Secondary EHS Protocol Header. A default set of values are used to populate the EHS header fields. These defaults include the following: EHS Protocol Version ID: 2, Project Identifier: ISS, Operational Support Mode: Ground Test, Data Mode: Real-Time, Mission/Increment: 0, Secondary Protocol Header Type: "PDSS Payload CCSDS Packet". Other header field values are set to zero.

When a CCSDS Primary Header is added the following default values are used: Type: 1, Secondary Header Flag: 1. Other header field values are set to zero.

The Modify Header button provides access to the Modify Header Dialog. This dialog provides a way to “define” or “override” some of the fields in the EHS header and CCSDS header. For example, the EHS header contains a “Data Mode” field. The Modify Header Dialog allows you to specify the data mode that should be placed in this field before the packet is forwarded. If you specify values for these fields, and they do not exist in the packet to be forwarded, the settings will be ignored. This could occur if you specify a data mode and you are forwarding a CCSDS packet. A CCSDS packet does not have an EHS header so the “Data Mode” field does not exist in the packet to be forwarded. Modifying header field values is optional. Default values will be used if no updates are provided in this dialog.

Information about Selecting a Source IP Address and Source Port Number:

There are a few things to be aware of when selecting a Source IP Address and Source Port Number. Remember that the combination of an IP Address and a Port Number is like a home address. It identifies where data will arrive and where it can be picked up for sending out (forwarding). Unlike your mailbox at home, in the network world you can't use the same home address for everything. If you have configured your TReK system to receive data, you need to follow certain rules when selecting an IP Address and Port Number to forward data. These rules may be most easily explained by using some concrete examples.

Scenario 1

If you have not configured your TReK system to receive data, then there are no constraints associated with selecting a Source IP Address and Source Port Number to forward data. This might be the case when you are running a local TReK playback. Suppose you want to forward the playback data to two different destinations. You can use the same exact Source IP Address and Source Port Number for both destinations. You can also use the same transmission protocol or different transmission protocols.

Scenario 2

Suppose you have configured your TReK system to receive data via UDP on IP Address 111.111.111.111 and port number 6100. You can only use this IP Address and Port Number as a Source IP Address and Source Port Number if you forward the data using TCP. You cannot use it to forward the data using UDP.

Scenario 3

Suppose you have configured your TReK system to receive data via TCP on IP Address 111.111.111.111 and port number 6100. You can only use this IP Address and Port Number as a Source IP Address and Source Port Number if you forward the data using UDP. You cannot use it to forward the data using TCP.

Scenario 4

Suppose you have configured your TReK system to receive data via UDP on IP Address 111.111.111.111 and port number 6100. Suppose you have also received your TReK system to receive data via TCP on IP Address 111.111.111.111 and port number 6100. In this situation you cannot use the IP Address 111.111.111.111 port number 6100 combination for any forwarding activities.

Bottom Line: Try to use unique port numbers for everything and you'll be safe (unless of course some other application has already used your supposedly unique port number in which case you'll have to select another one). But don't worry, there are thousands of port numbers and you're sure to find one you can use.

6.30 Add Device Destination

The Add Device Destination dialog is shown in Figure 31. This dialog is used to add a device destination to the list of device destinations in the Forwarding List Dialog.

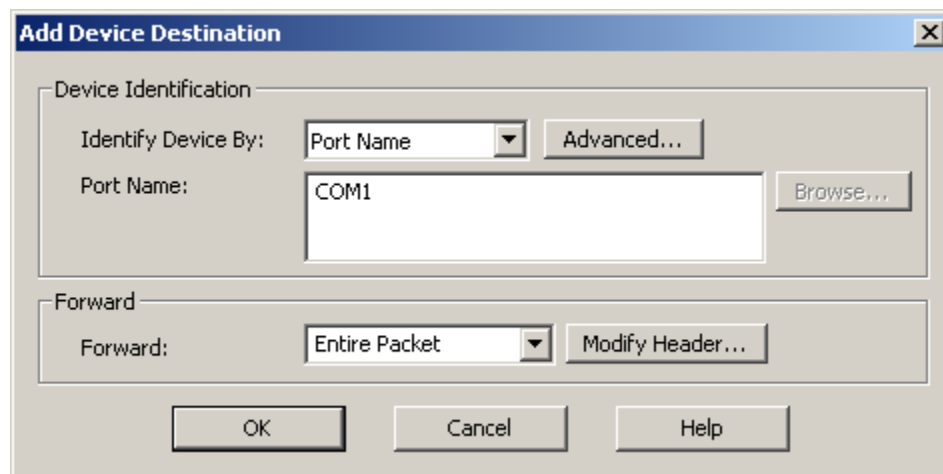


Figure 31 Add Device Destination

Each field in the Add Device Destination dialog is described below.

Identify Device By (Selection Required)

The Identify Device By option menu is used to indicate the type of device that TReK should communicate with to receive data.

Port Name/GUID/API Library (Required Field)

If the “Identify Device By” option menu is set to Port Name, then the title of this field will be Port Name, and a port name must be entered. If the “Identify Device By” option menu is set to GUID, then a GUID must be entered. The GUID is associated with the computer port where the data will arrive. A GUID is a Microsoft implementation of the distributed computing environment (DCE) universally unique identifier (UUID). If the

“Identify Device By” option menu is set to API Library, then a Dynamic Link Library (DLL) must be entered. This library provides the communication support between TReK and the device. The Browse button next to the field can be used to browse for the DLL.

Advanced Button

The Advanced button displays the Advanced Device dialog which provides a way to set advanced options associated with devices.

Forward (Selection Required)

The Forward option menu provides a way to identify which portion of the packet to forward. Headers may be added or removed. Options include Entire Packet, EHS Packet, CCSDS Packet, and Data Zone. The packet forwarded is determined by the combination of the incoming packet and the option selected. For example, if the incoming packet is an EHS packet and you choose to forward a CCSDS Packet, then the EHS header will be deleted and the remaining portion of the packet (CCSDS header + Data Zone) will be forwarded. If the incoming packet is a CCSDS packet and you choose to forward an EHS Packet, then an EHS header will be added to the packet before it is forwarded. In some cases these selections will forward the same packet content. For example, a PRCU packet is comprised of a CCSDS header and a data zone. A PRCU packet does not have an EHS header. Therefore, selecting either Entire Packet or CCSDS Packet will forward the same packet content. The table below shows the results of various combinations of incoming packets and options.

Incoming Packet	Option Selected	Packet Forwarded
EHS Packet	EHS Packet	EHS Packet
EHS Packet	Entire Packet	EHS Packet
EHS Packet	CCSDS Packet	CCSDS Packet (EHS header is removed)
CCSDS Packet	EHS Packet	EHS Packet (EHS header is added)
CCSDS Packet	Data Zone	Data Zone (CCSDS header is removed)
CCSDS Packet	Entire Packet	CCSDS Packet
EHS Packet	Data Zone	Data Zone (EHS and CCSDS headers are removed)
PRCU Packet	Entire Packet	PRCU Packet (CCSDS header and data zone)
PRCU Packet	CCSDS Packet	PRCU Packet (CCSDS header and data zone)

When an EHS header is added it consists of a Primary EHS Protocol Header and a Secondary EHS Protocol Header. A default set of values are used to populate the EHS header fields. These defaults include the following: EHS Protocol Version ID: 2, Project Identifier: ISS, Operational Support Mode: Ground Test, Data Mode: Real-Time, Mission/Increment: 0, Secondary Protocol Header Type: “PDSS Payload CCSDS Packet”. Other header field values are set to zero.

When a CCSDS Primary Header is added the following default values are used: Type: 1, Secondary Header Flag: 1. Other header field values are set to zero.

The Modify Header button provides access to the Modify Header Dialog. This dialog provides a way to “define” or “override” some of the fields in the EHS header and CCSDS header. For example, the EHS header contains a “Data Mode” field. The Modify Header Dialog allows you to specify the data mode that should be placed in this field before the packet is forwarded. If you specify values for these fields, and they do not exist in the packet to be forwarded, the settings will be ignored. This could occur if you specify a data mode and you are forwarding a CCSDS packet. A CCSDS packet does not have an EHS header so the “Data Mode” field does not exist in the packet to be forwarded. Modifying header field values is optional. Default values will be used if no updates are provided in this dialog.

6.31 Modify Header Dialog

The Modify Header dialog is shown in Figure 32. This dialog will appear when you select the Modify Header button located next to a Forward option. This could be in the Add Forwarding Address dialog or the Add Device Destination dialog. This dialog provides a way to “override” some of the fields in the EHS header and CCSDS header. For example, the EHS header contains a “Data Mode” field. The Modify Header Dialog allows you to specify the data mode that should be placed in this field before the packet is forwarded. If you specify to override these fields, and they do not exist in the packet to be forwarded, the settings will be ignored. This could occur if you specify a data mode and you are forwarding a CCSDS packet. A CCSDS packet does not have an EHS header so the “Data Mode” field does not exist in the packet to be forwarded.

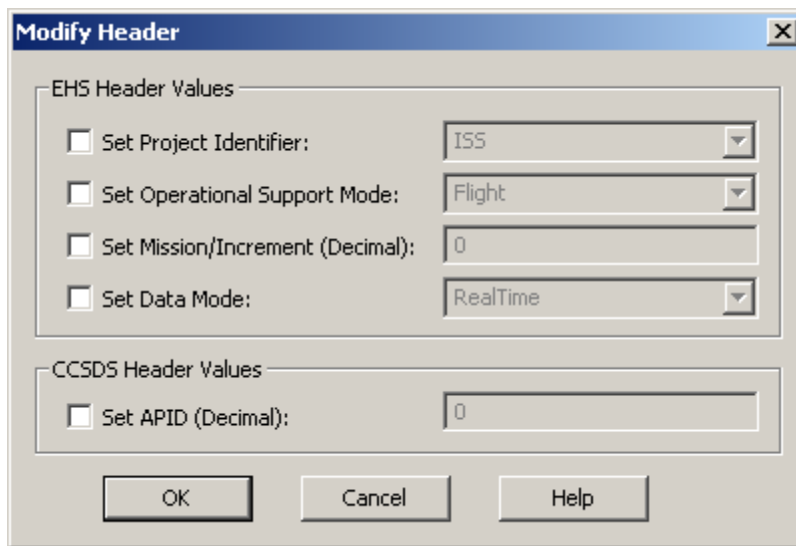


Figure 32 Modify Header Dialog

Set Project Identifier

If you check this box, the project identifier in the forwarded packet will be set to the project identifier you select in the corresponding option menu.

Set Operational Support Mode

If you check this box, the operational support mode in the forwarded packet will be set to the operational support mode you select in the corresponding option menu.

Set Mission/Increment

If you check this box, the Mission/Increment in the forwarded packet will be set to the Mission or Increment number you enter in the corresponding text field. Enter the Mission or Increment in decimal notation.

Set Data Mode

If you check this box, the data mode in the forwarded packet will be set to the data mode you select in the corresponding option menu.

Set APID

If you check this box, the APID in the forwarded packet will be set to the APID you enter in the corresponding text field. Enter the APID in decimal notation.

6.32 Packet Properties Dialog

When you select Show Packet Properties for a non-playback packet a dialog that is identical (except for the title) to the Add A Packet dialog (see section 6.5) will be displayed. This is the Packet Properties dialog and it will be populated with all the properties you selected when you added the packet. An example is shown in Figure 33. If you have never activated the packet then you can change any of the packet's properties. However, if you have already activated the packet, then some of the packet's properties will be insensitive (such as the Database field).

Packet Properties for Packet 7 [PDSS Payload, RealTime]

General Options

Packet Information

Database: C:\TelemetryDatabase.mdb Browse...

Packet ID (APID): 7 Browse Database...

Packet Type: PDSS Payload

Data Mode: RealTime

Type of Processing: Process Entire Packet

☒ Packet Source: Network ☐ Packet Source: Device

Local IP Address: 127.0.0.1 Browse...

Local Port Number: 6100

Protocol: UDP

Additional Protocol Settings

Join Multicast Address Groups...

Identify Device By: Port Name Advanced...

Port Name: COM1 Browse...

Packet Rate Information

Expected Packet Rate: ☒ Pkts/Sec: 1 ☐ Bits/Sec: 1000

OK Cancel Apply Help

Figure 33 Packet Properties Dialog

If you select Show Packet Properties for a playback packet a dialog that is identical (except for the title) to the Add A Playback Packet dialog (see section 6.20) will be displayed. This dialog will be populated with the playback packet's properties. An example is shown in Figure 34. As with non-playback packets, if the packet has not been activated you can change any of the properties. If properties on the General tab or the Files tab are changed, the packet must be reactivated. If a reactivation is necessary, you will be prompted with a question about whether to proceed before the reactivation takes place.

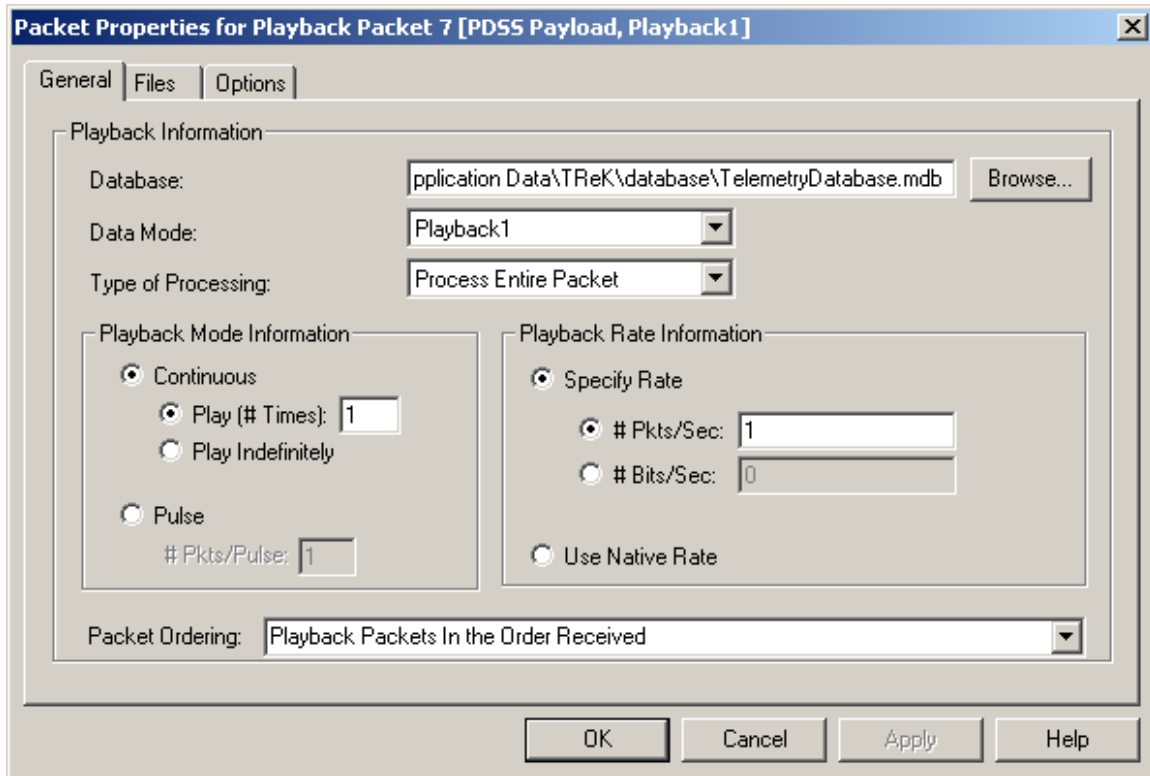


Figure 34 Playback Packet Properties Dialog

The Packet Properties dialog can be accessed using the Packet Menu's Show Packet Properties option, by using the Packet List pop-up menu, or by double clicking on the packet in the main window packet list. You must have a packet selected in order to access this dialog.

If you select Show Packet Properties for a custom data packet a dialog that is identical (except for the title) to the Add A CDP Packet dialog (see section 6.10) will be displayed. This dialog will be populated with the custom data packet's properties. An example is shown in Figure 35. This dialog will be populated with the custom data packet's properties. As with non-playback packets, if the packet has not been activated you can change any of the properties. However, if you have already activated the packet, then some of the packet's properties will be insensitive (such as the TReK Database information, etc.).

Packet Properties for Packet C0 [CDP, RealTime]

General | ERIS | Parameters | Options

General

POIC Database: Data Mode:

Name and Location for Newly Created TReK Database that will hold CDP Packet Definition

TReK Database Name:

TReK Database Directory: ...

Type of Processing:

Packet Request and Receipt

Local IP Address: Browse...

Local Port Number for Request:

Local Port Number for Data Packets:

Duration

☒ Infinite ☐ Specify Days Hours Mins Secs

Days: Hours: Mins: Secs:

Packet Rate

Packet Rate: ☐ Rate Equivalent to the Fastest Source APID ☒ Time Between Packets (seconds):

Expected Packet Rate (packets/sec):

OK Cancel Apply Help

Figure 35 Custom Data Packet Properties Dialog

6.33 Advanced Recording Dialog

The Advanced Recording dialog is shown in Figure 36. This dialog will appear when you select the Advanced button located next to a Packet Recording option. This could be in the Add A Packet dialog, Add A Playback Packet dialog, Packet Properties dialog, or Enter Recording Information dialog. You use this dialog to tell your TReK system what recording properties to use for a particular packet.

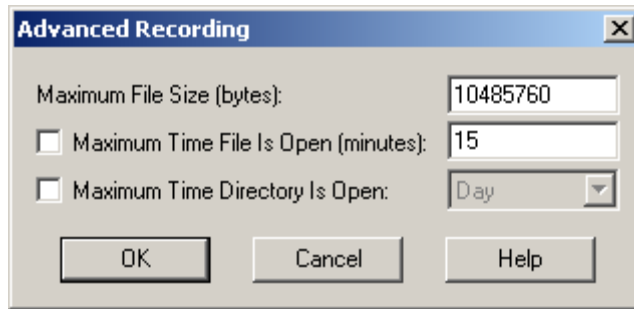


Figure 36 Advanced Recording Dialog

Maximum File Size (bytes) (Required Field)

The Maximum File Size information is used to determine when to close a packet recording file. This property is always used.

Maximum Time File Is Open (minutes)

The Maximum Time File Is Open Checkbox is used to indicate whether the file should be closed based on a maximum time. This is an optional property. If you check the checkbox then this property will be used. If you check the box, then you must also fill in the text field with the amount of time in minutes that should be used as the maximum time. The Maximum Time File Is Open property is used in addition to the Maximum File Size property. If the maximum size is reached before the maximum time, then the file will be closed based on the size. However, if the maximum time is reached before the maximum size is reached, the file will be closed based on the maximum time.

Maximum Time Directory Is Open

The Maximum Time Directory Is Open Checkbox is used to indicate whether recording files should be placed in sub-directories within the parent base directory. The directories will be open/closed based on Day, Week, Month, or Year. This is an optional property. If you check the checkbox then this property will be used.

6.34 Enter Recording Information Dialog

The Enter Recording Information dialog is shown in Figure 37. This dialog will appear when you select Start Recording from the Packet menu. You use this dialog to tell your TREK system where you want to store your data recording files and what you want to use for the Base Filename.

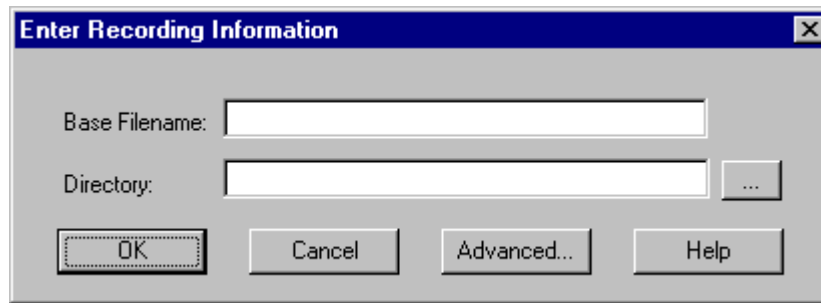


Figure 37 Enter Recording Information Dialog

Each field in the Enter Recording Information dialog is described below.

Base Filename (Required Field)

When your TReK system records a packet, the raw packet data is stored in one or more files in a local directory. A base filename (provided by you) is used as the base name of the file and the rest of the file name is generated by your TReK system. The complete filename indicates the time the file was created and closed. When you want to play the data back you will be asked to provide this Base Filename. Therefore, you should try to select a meaningful name that will be easy to remember and is closely associated with the data that you are recording.

Directory (Required Field)

The Directory information is used to tell your TReK system which directory should be used when storing your data recording files. When you want to play the data back, you will be asked to provide this Directory information so your TReK system can find the files. This field requires a complete directory path. An example of this is `C:\MyRecordingFiles\.`. If you don't like to type or you need help defining the complete path, you can push the ... (dot dot dot) button located to the right of the Directory field. This will bring up a Windows Browse for Folder dialog which you can use to identify the local directory path where you want to store your recorded data files. The Browse for Folder dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help.

Dialog Buttons

There is one non-standard button on the Enter Recording Information dialog box. It is described below.

Advanced

The Advanced button displays the Advanced Recording Properties dialog. This dialog is described in section 6.33.

6.35 View Packets Dialog

The View Packets dialog is shown in Figure 38. This dialog can be used to view packets that are arriving on the network or packets that are being played back during a local TReK playback. You can display a View Packets dialog for each packet in the main window packet list. The title of the dialog will identify which packets are being viewed. Please note that the View Packets window will not update automatically. You must push the Pulse button to retrieve the latest data. Since Packet viewing utilizes CPU and memory resources the default is for packet viewing to be off. The Packet Viewing service is most useful as a diagnostic tool. The Add A Packet, Add A CDP Packet, and Add A Playback Packet dialogs can be used to turn packet viewing services on and off.

TReK also provides a capability to view packets that are stored in one or more data recording files. The Recorded Data Viewer is described in section 6.118

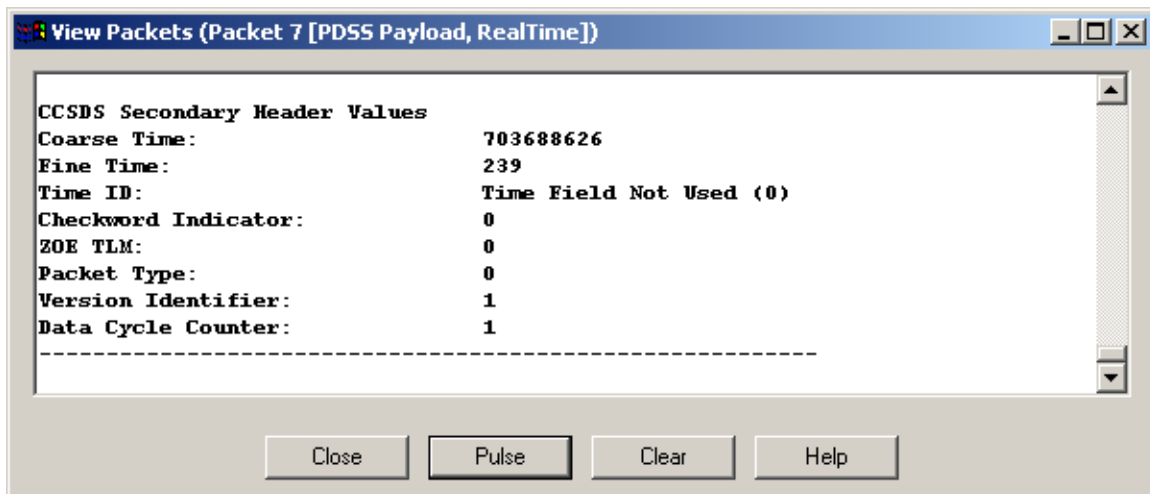


Figure 38 View Packets Dialog

Dialog Buttons

There are several non-standard buttons on the View Packets dialog. Each is described below.

Pulse

The Pulse button will retrieve a user-defined number of packets and display each packet's contents in a text/hexadecimal format in the View Packets dialog. Please note that if Packet Viewing is Off nothing will happen when you push the Pulse button. Packet Viewing can be turned on by using the Add A Packet (Options Tab) dialog, Add A CDP

Packet (Options Tab) dialog, or the Add A Playback Packet (Options Tab) dialog. This is also where you can configure the number of packets that should be retrieved when you push the Pulse button.

Clear

The Clear button will clear the display and the underlying buffer where the packets are stored. Therefore, if you push the Clear button, all the packets that TReK currently has stored in the buffer and the window will be deleted. However, any new packets that arrive after you push the clear button will be stored in the buffer and displayed in the packet viewer window. (Note: This does not affect TReK queues that are used to store incoming packets, packets to be recorded, packets to be forwarded, etc. So even if you push the clear button in a packet viewer window this does not affect data that is being processed, recorded to disk, forwarded, etc.

6.36 Login Dialog

The Login dialog is shown in Figure 39. This dialog is used to login to the POIC. Unless you enter the login information (Username and Password) in the Add ERIS Session dialog, you will always be prompted with this dialog when connecting to the POIC. Even if you are using a configuration file and you saved your configuration you will still be prompted. This is because the password is not saved in the configuration file for security reasons. Therefore, you will always be prompted to enter it. (Note: The title of the Login dialog is <ERIS Session Name> Login. Since you can set up multiple ERIS Sessions, the title shows which ERIS Session you are using to login.)

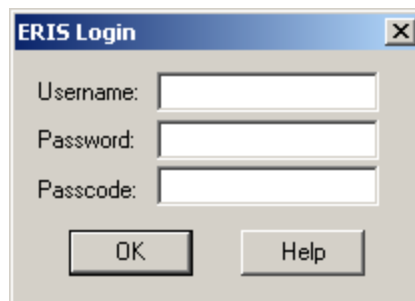


Figure 39 Login Dialog

Each field on the Login dialog is described below.

Username (Required Field)

The username for your POIC account.

Password (Required Field)

The password for your POIC account.

Passcode (Required Field)

The passcode for your POIC user account.

6.37 Change Password Dialog

The Change Password dialog is shown in Figure 40. This dialog is used to change your POIC account password. If your POIC account password has expired, this dialog will be displayed during the login process when you are establishing an ERIS session. You can also request to change your password. You can do this by using the Change Password button on the ERIS Sessions dialog. The change password feature is only available when you have an active ERIS session.

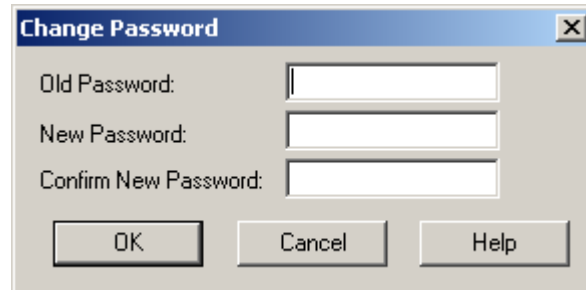
A screenshot of a Windows-style dialog box titled "Change Password". It has a blue title bar with a close button (X) in the top right corner. The dialog contains three text input fields: "Old Password:", "New Password:", and "Confirm New Password:". Below the fields are three buttons: "OK", "Cancel", and "Help".

Figure 40 Change Password Dialog

Each field on the Change Password dialog is described below.

Old Password (Required Field)

The old password associated with your POIC account.

New Password (Required Field)

The new password you would like to assign to your POIC account.

Confirm New Password (Required Field)

The new password you would like to assign to your POIC account. This should match the password you entered in the New Password field.

6.38 Select MOP Dialog

The Select MOP dialog is shown in Figure 41. This dialog is used to select a POIC Mission/Operational Support Mode/ Project (MOP) when logging in to the POIC. If you save your configuration, the MOP will be saved in the configuration file. The Select MOP dialog may or may not be displayed during the login sequence when activating a POIC destination. Section 6.13 provides information that explains when you will be prompted to select a MOP.

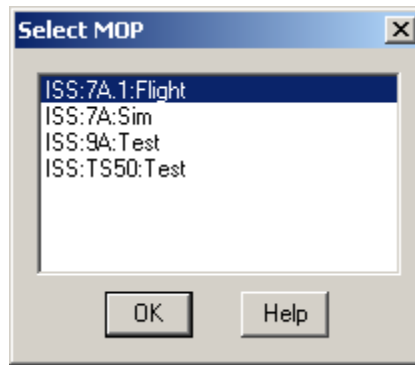


Figure 41 Select MOP Dialog

6.39 Select Role Dialog

The Select Role dialog is shown in Figure 42. This dialog is used to select a POIC Role when logging in to the POIC. If you save your configuration, the Role will be saved in the configuration file. The Select Role dialog will always be displayed during the login sequence when activating a POIC destination.

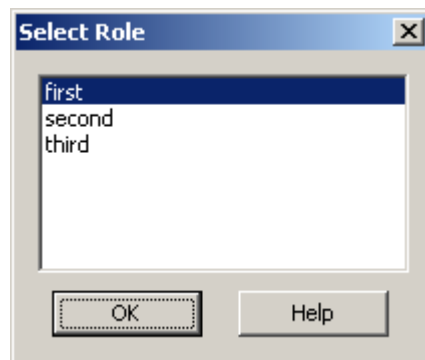


Figure 42 Select Role Dialog

6.40 POIC Warning Banner Dialog

When you log into the POIC, the POIC Warning Banner dialog shown in Figure 43 will be displayed. You must push the OK button to acknowledge that you are logging into a government computer to log in successfully.

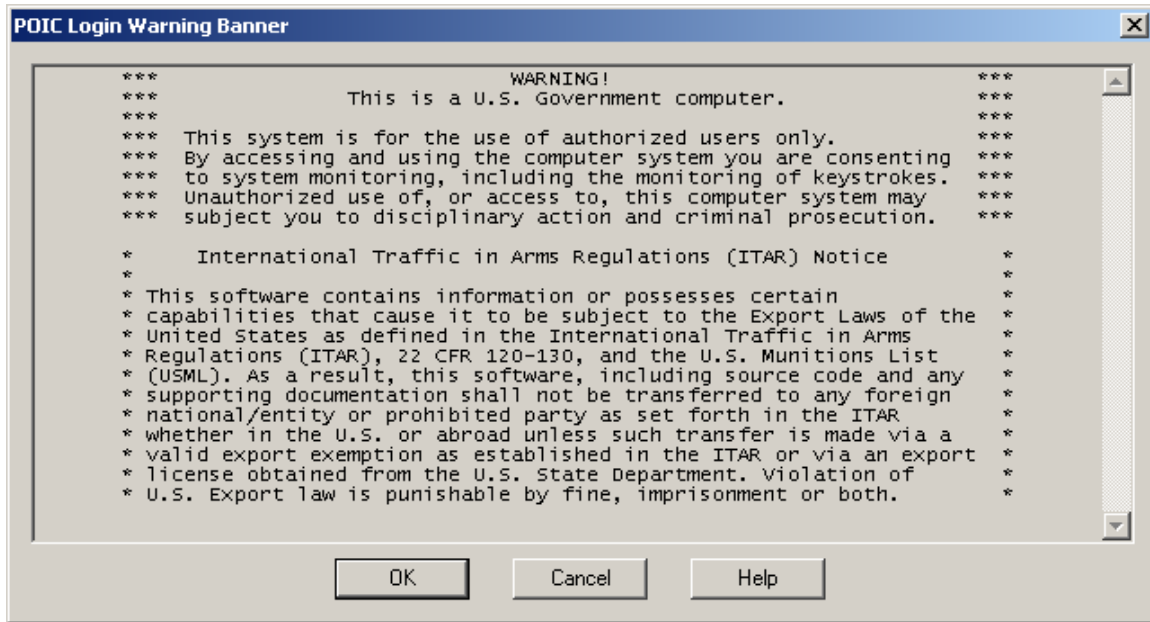


Figure 43 POIC Warning Banner Dialog

6.41 Parameters Dialog

The Parameters dialog is shown in Figure 44. This dialog shows a list of all the unique parameters currently being processed by your TReK system.

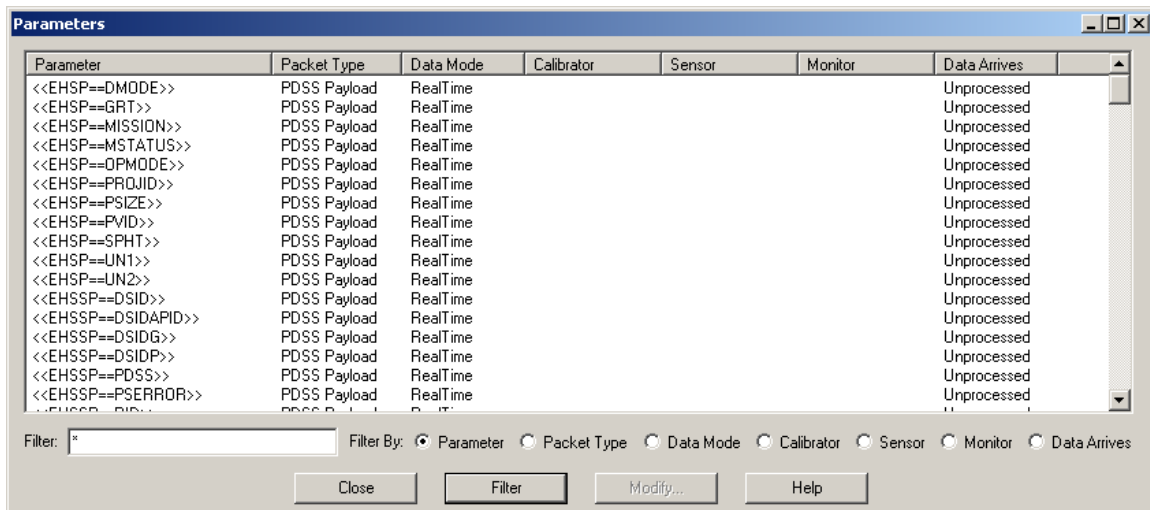


Figure 44 Parameters Dialog

When there are no packets in the main window packet list, or there are one or more packets but none of the packets have been activated, this dialog will be empty (there will be no parameters in the list). This is because when the list is empty or no packets have been activated there are no packets being processed, and therefore there are no

parameters being processed. However, once a packet has been added to the packet list and activated (and the processing type for the packet is Process Entire Packet, Process Selected Parameters, Process On Request Hybrid, or Process On Request Only, then the parameters associated with the packet and the specific processing type will be listed in the Parameters dialog.

As packets in the main window packet list are activated, the parameters associated with those packets and specific processing type will be added to the Parameters dialog. Please note that parameters are only added for packets that have the processing type set to Process Entire Packet, Process Selected Parameters, Process On Request Hybrid, or Process On Request Only. The parameters that are added are determined by the type of processing selected. For example, if the processing type is Process Entire Packet then all the parameters will be added. However, if the processing type is Process On Request Only, then only parameters from the EHS header and CCSDS header will be added. Other parameters will not appear until they are requested to be processed through a TReK User API call. If the processing type is “Pass-Thru” or “Off”, then the parameters in the packet will not be processed and therefore will not appear in the Parameters dialog.

In some cases the same parameter may be in more than one packet. Suppose that you add two packets to the main window packet list with the following properties:

Packet ID:	Packet 2	Packet ID:	Packet 3
Processing:	Process Entire Packet	Processing:	Process Entire Packet
Packet Type:	PDSS Payload	Packet Type:	PDSS Payload
Data Mode:	RealTime	Data Mode:	RealTime

When you activate the packets, all the parameters associated with the packets will be added to the Parameters dialog. Suppose that parameter M_CP_TYPE_1 is in both packets. Will it appear twice in the Parameters dialog? The answer is no. It will only appear once. Recall from the TReK Telemetry Tutorial (TREK-USER-002) that there are three properties that make a packet unique: Packet ID, Packet Type, and Data Mode. Similarly, there are three properties that make a measurement unique: Measurement Name (MSID), Packet Type, and Data Mode. Therefore, if Packet 2 and Packet 3 both have the same Packet Type and Data Mode, then the parameters in those packets will also have the same packet type and data mode. In this case, if the parameter name is also the same (which it is – M_CP_TYPE_1), then these two parameters are actually the same parameter (even though the data value is coming down in two different packets), and therefore will only appear in the Parameters dialog once.

Each column in the Parameters dialog is described below:

Parameter

The parameter name.

Packet Type

The packet type for the packet which contains the parameter.

Data Mode

The data mode for the packet which contains the parameter.

Calibrator

The calibrator associated with the parameter. This column will be blank if no calibrator has been assigned to the parameter.

Sensor

The sensor associated with the parameter. This column will be blank if no sensor has been assigned to the parameter.

Monitor

The monitor associated with the parameter. This column will be blank if no monitor has been assigned to the parameter.

Data Arrives

The Data Arrives column indicates whether the data arrives unprocessed, converted, or calibrated.

Dialog Buttons

There are two non-standard buttons on the Parameters dialog. They are described below.

Filter

The Filter button along with the Filter field and Filter By radio buttons provide a way to filter the list of parameters. The Filter By radio buttons are used to indicate which column to use for the filter. The Filter field is used to specify the filter criteria. If you leave the Filter field blank all parameters will be listed. If you put a * in the Filter field all parameters will be listed. The * character can be used to match one or more characters and the ? character can be used to match a single character. For example MSID1* means match all the parameters that begin with the characters MSID1. MSID1?1 means match all the parameters that begin with the characters MSID1, followed by a single character, followed by the character 1.

Note: When a filter has two or more * characters, only the first * character will be interpreted as zero or more characters. The 2nd, 3rd, etc. instances of * will be interpreted as a literal * character. Since most of the name fields (Parameter, Calibrator, Sensor, Monitor, etc.) that you can filter against do not support * as a valid character, your filter will return no items in the list if it has more than one * character. The only exception to this is for filters against a Description field where an * is a valid character.

You can enter more than one ? character in a filter and each of them will be interpreted as any single character. However, all ? characters after the first * character are interpreted as literal ? characters.

Modify

The Modify button provides access to the Modify Parameter dialog box. This dialog can be used to modify the parameter's properties. The Modify button is only sensitive when a parameter in the list has been selected.

6.42 Modify Parameter Dialog

The Modify Parameter dialog is shown in Figure 45. This dialog is used to modify the parameter's properties.

Modify Parameter

Name: MSID110 Packet Type: PDSS Payload Data Mode: RealTime

Technical Name: MSID110

Data Type: IUNS Engineering Unit:

Byte Order: No Swapping Maximum Occurrences: 4

Total Length: 5

Description: Measurement with IUNS data type which is 5 bits long.

Calibrator

Calibrator Type: Point Pair

Calibrator Name: MSID110

Default Set Number: 2

Switch Parameter: MSID079

Switch Name: MSID110

Switch Type: State Code

Sensor

Sensor Type: Limit

Sensor Name: MSID110

Default Set Number: 1

Switch Parameter:

Switch Name:

Switch Type: None

Monitor

Monitor Type: Limit

Monitor Name: MSID110

Default Set Number: 1

Preprocessed Parameter

Data Arrives: Unprocessed

Error Control Name:

OK Cancel Help

Figure 45 Modify Parameter Dialog

Each field in the Modify Parameter dialog is described below.

Name

The parameter name. This field cannot be modified.

Packet Type

The packet type. This field cannot be modified.

Data Mode

The data mode. This field cannot be modified.

Technical Name

The parameter's technical name.

Data Type

The parameter's data type. This field cannot be modified.

Engineering Unit

The engineering unit associated with the parameter.

Byte Order

Indicates whether the parameter's byte order is no swapping, byte swapped, word swapped, byte and word swapped, or byte reversal. This field cannot be modified.

Maximum Occurrences

The maximum number of occurrences of the parameter in the packet. This field cannot be modified.

Total Length

The parameter's total length in bits. This field cannot be modified.

Description

A description of the parameter.

Calibration Information

The Calibration section contains properties associated with calibrating the parameter. Please refer to the TReK Telemetry Tutorial (TREK-USER-002) for information about calibration and terminology associated with calibration.

Calibrator Type

The type of calibration to be performed. Choices are: None, Point Pair, Polynomial Coefficient, or State Code.

Calibrator Name

The name of the calibrator that should be used to calibrate the parameter.

Default Set Number

The default set number. The default set number is used if switching is not defined or if switching does not find a matching set.

Switch Parameter

The name of the parameter to use as a Switch Parameter if switching is to be used. If this field is left blank then switching will not be used. If this field is filled in then switching will be used.

Switch Name

The name of the switch that should be used for calibration switching.

Switch Type

The type of switching that should be used. Choices are: None, Range, or State Code.

Sensing Information

The Sensing section contains properties associated with sensing the parameter. Please refer to the TReK Telemetry Tutorial (TREK-USER-002) for information about sensing and terminology associated with sensing.

Sensor Type

The type of sensing to be performed. Choices are: None, Expected State, or Limit.

Sensor Name

The name of the sensor that should be used to sense the parameter.

Default Set Number

The default set number. The default set number is used if switching is not defined or if switching does not find a matching set.

Switch Parameter

The name of the parameter to use as a Switch Parameter if switching associated with sensing is to be used. If this field is left blank then switching will not be used. If this field is filled in then switching will be used.

Switch Name

The name of the switch that should be used for sensing switching.

Switch Type

The type of switching that should be used. Choices are: None, Range, or State Code.

Monitoring Information

The Monitoring section contains properties associated with monitoring the parameter. Please refer to the TReK Telemetry Tutorial (TREK-USER-002) for information about monitoring and terminology associated with monitoring.

Monitor Type

The type of monitoring to be performed. Choices are: None, Expected State, or Limit.

Default Set Number

The set that will be used for monitoring. Please note that switching is not performed for monitors.

Monitor Name

The name of the monitor that should be used to monitor the parameter.

Preprocessed Parameter

The Preprocessed Parameter section contains properties associated with the parameter if it is a preprocessed parameter. This section will be insensitive if the parameter is not a preprocessed parameter. Please note that a parameter is considered to be a preprocessed parameter if the parameter is processed by the POIC and placed into a GSE packet or a CDP packet. Processing in this case may mean it is simply extracted from one packet and placed unprocessed into the GSE or CDP packet. Therefore any non-header parameter within a GSE or CDP packet is considered to be a preprocessed parameter. Even if a parameter arrives unprocessed it is still considered a preprocessed parameter because of the potential for errors that can occur during processing at the POIC.

Data Arrives

Identifies how the data arrives. This might be Unprocessed, Converted, or Calibrated. This field cannot be modified.

Error Control Name

The name of the error control object that is assigned to the preprocessed parameter.

6.43 Calibrators Dialog

The Calibrators dialog is shown in Figure 46. This dialog shows a list of all the unique calibrators currently in use or available for use. You can sort the list using Calibrator Name, Calibrator Type, or Description (any of the column headings). To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

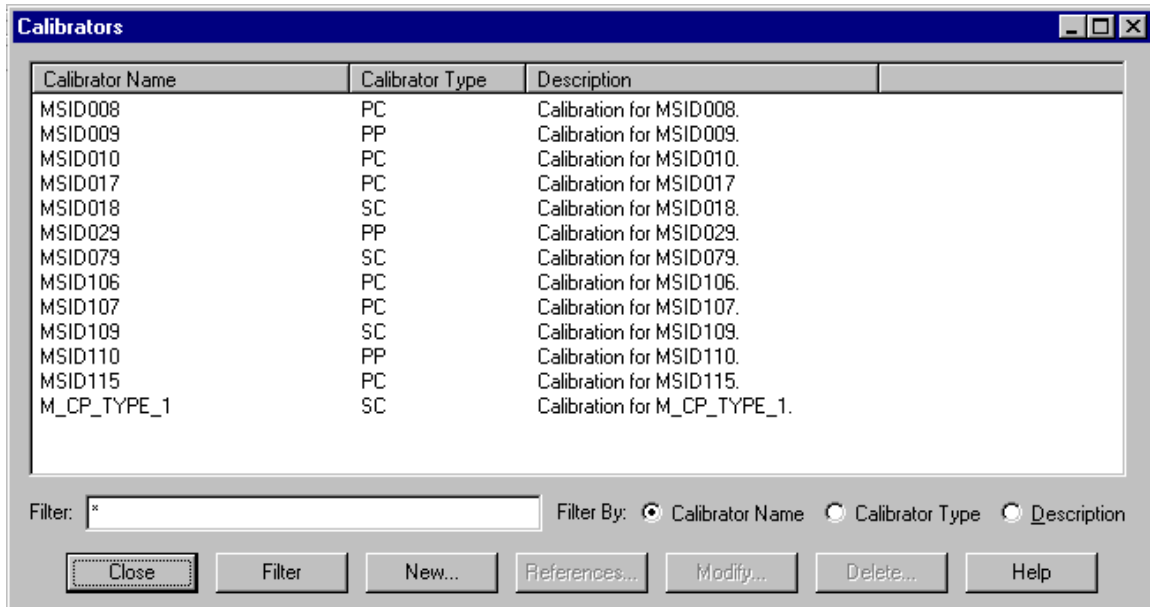


Figure 46 Calibrators Dialog

Each column in the Calibrators dialog is described below. The items in the list can be sorted based on column.

Calibrator Name

The name of the calibrator.

Calibrator Type

The calibrator's type. Valid types are: PC (Polynomial Coefficient), PP (Point Pair), or SC (State Code).

Description

A description of the calibrator.

Dialog Buttons

There are several non-standard buttons on the Calibrators dialog box. Each is described below.

Filter

The Filter button along with the Filter field and Filter By radio buttons provide a way to filter the list of calibrators. The Filter By radio buttons are used to indicate which column to use for the filter. The Filter field is used to specify the filter criteria. If you leave the Filter field blank all calibrators will be listed. If you put a * in the Filter field all calibrators will be listed. The * character can be used to match one or more characters and the ? character can be used to match a single character. For example MSID1* means match all the calibrators that begin with the characters MSID1. MSID1?1 means match

all the calibrators that begin with the characters MSID1, followed by a single character, followed by the character 1.

Note: When a filter has two or more * characters, only the first * character will be interpreted as zero or more characters. The 2nd, 3rd, etc. instances of * will be interpreted as a literal * character. Since the Calibrator Name field does not support * as a valid character, your filter will return no items in the list if it has more than one * character. The * is a valid character for the Description field and more than one * can be used in a filter for the Description field.

You can enter more than one ? character in a filter and each of them will be interpreted as any single character . However, all ? characters after the first * character are interpreted as literal ? characters.

New

The New button provides a way to create a new calibrator. Once defined this calibrator will be added to the list of available calibrators. Once it is available it can be assigned to one or more measurements. If you save your configuration, any new calibrators that were defined using this “New” capability will be saved with the configuration.

References

The References button provides access to the References dialog box. The References dialog box provides a way to see the list of measurements that are using the calibrator. This is helpful in case you have forgotten which measurements are using the calibrator. The References dialog box is described in section 6.45. The References button will only be available when an item in the list is selected.

Modify

The Modify button provides access to a dialog box that can be used to view or modify properties associated with the calibrator. The Modify button will only be available when an item in the list is selected.

Delete

The Delete button provides a way to delete a calibrator. A calibrator can only be deleted if it has no references. Therefore, it is not possible to delete a calibrator that is in use. The Delete button will only be available when an item in the list is selected.

6.44 New Calibrator Dialog

The New Calibrator dialog is shown in Figure 47. This dialog box is used to identify the type of calibrator to create.

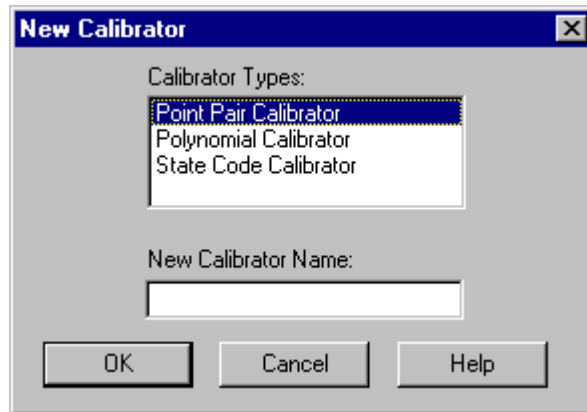


Figure 47 New Calibrator Dialog

Each field in the New Calibrator dialog box is described below:

Calibrator Types

The Calibrator Types field list the types of calibrators that can be created.

New Calibrator Name

The name to use for the new calibrator.

6.45 References Dialog

The References dialog is shown in Figure 48. This dialog shows a list of references for a particular processing element (such as a calibrator, sensor, switch, monitor, or error control for preprocessed parameter).

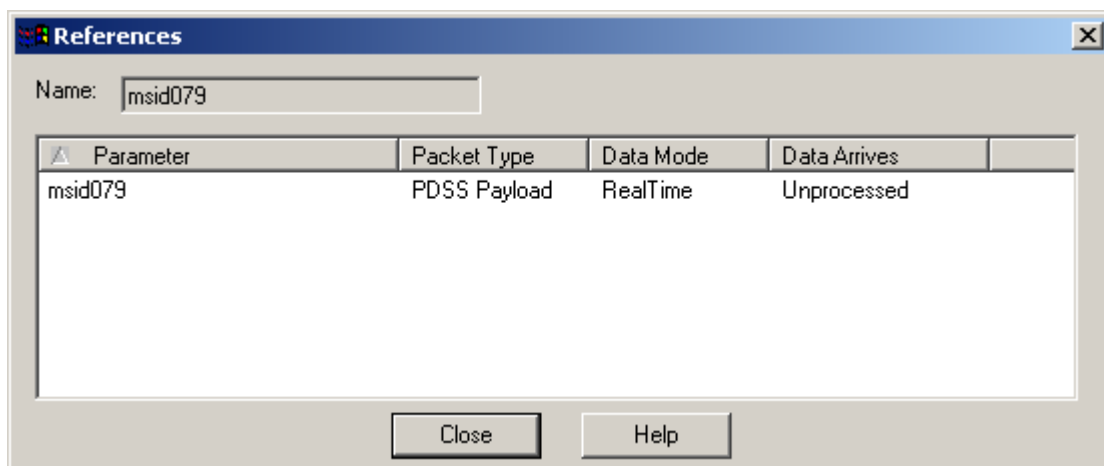


Figure 48 References Dialog

Each column in the References dialog is described below:

Parameter

The name of the parameter that is referencing the processing element (the calibrator, sensor, switch, monitor, or error control for preprocessed parameter).

Packet Type

The Packet Type associated with the parameter.

Data Mode

The Data Mode associated with the parameter.

Data Arrives

The Data Arrives column indicates whether the data arrives unprocessed, converted, or calibrated.

6.46 New Polynomial Coefficient Calibrator Dialog

The New Polynomial Coefficient Calibrator dialog is shown in Figure 49. This dialog will appear when the New button is pushed for a Polynomial Coefficient calibrator. If New has been selected, then this dialog will be empty for the most part. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to add a new set push the Add Set button. Then once you have added a set, you can modify the set by selecting the set number using the Set Number combo box and then pushing the Modify Set button. This will bring up a Modify Set dialog that can be used to modify the set data.

New Polynomial Coefficient Calibrator

Name: Set Number:

Description:

Coefficient Information

Degree:	<input type="text" value="0"/>	Coefficient 5:	<input type="text" value="0"/>
Coefficient 0:	<input type="text" value="0"/>	Coefficient 6:	<input type="text" value="0"/>
Coefficient 1:	<input type="text" value="0"/>	Coefficient 7:	<input type="text" value="0"/>
Coefficient 2:	<input type="text" value="0"/>	Coefficient 8:	<input type="text" value="0"/>
Coefficient 3:	<input type="text" value="0"/>	Coefficient 9:	<input type="text" value="0"/>
Coefficient 4:	<input type="text" value="0"/>		

Figure 49 New Polynomial Coefficient Calibrator Dialog

Each field in the New Polynomial Coefficient Calibrator dialog is described below.

Name

The name of the calibrator.

Set Number

The set number field provides a way to select a particular set to view or modify.

Description

A description of the calibrator. The Modify Description button provides access to a dialog that can be used to modify the description.

Coefficient Information

The Coefficient Information section contains information about each of the polynomial coefficients associated with one particular set.

Degree

The degree of the polynomial. The degree must be consistent with the data in the coefficient fields. For example, if you enter 3 in the Degree field then the Coefficient0, Coefficient1, Coefficient2, and Coefficient3 fields should be populated with the correct coefficient information.

Coefficient0 through Coefficient 9

The Coefficient fields represent each of the 10 coefficients. See the Telemetry Database Definition Document (TREK-USER-011) for a description of the coefficients.

*Buttons*Add Set

When you push the Add Set button the Add Set dialog box described in section 6.48 will be displayed. This dialog provides a way to add a new polynomial coefficient set for the calibrator.

Modify Set

When you push the Modify Set button the dialog box described in section 6.49 will be displayed. This dialog provides a way to modify an existing polynomial coefficient set for the calibrator. It will be populated with the data corresponding to the set you selected in the Polynomial Coefficient Calibrator dialog.

Delete Set

When you push Delete Set, the currently selected set will be deleted. You will be asked to confirm that you want to delete the set since the delete action cannot be reversed. You cannot delete the last set.

Modify Description

When you push the Modify Description button the Modify Description dialog box will be displayed. This dialog box is used to modify the calibrator's description. It is described in section 6.50.

6.47 Modify Polynomial Coefficient Calibrator Dialog

The Modify Polynomial Coefficient Calibrator dialog is shown in Figure 50. This dialog box will appear when the Modify button is pushed for a Polynomial Coefficient calibrator. If Modify has been selected, then the dialog will be populated with the calibrator's properties. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to modify a particular set, the set must be selected using the Set Number combo box and then the Modify Set button must be selected. This will bring up a Modify Set dialog that can be used to modify the set data. The Modify

Polynomial Coefficient Calibrator dialog works exactly like the New Polynomial Coefficient Calibrator dialog which is described in section 6.46.

Modify Polynomial Coefficient Calibrator

Name: Set Number:

Description:

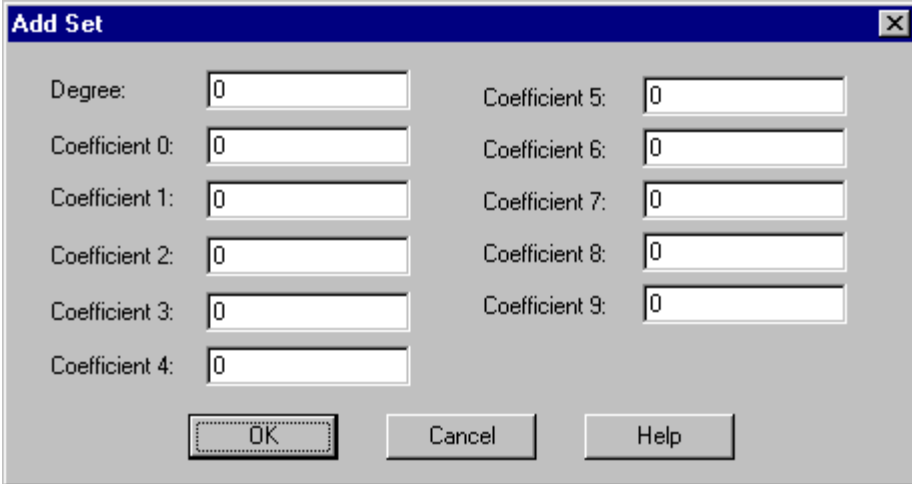
Coefficient Information

Degree:	<input type="text" value="1"/>	Coefficient 5:	<input type="text" value="0"/>
Coefficient 0:	<input type="text" value="0"/>	Coefficient 6:	<input type="text" value="0"/>
Coefficient 1:	<input type="text" value="1"/>	Coefficient 7:	<input type="text" value="0"/>
Coefficient 2:	<input type="text" value="0"/>	Coefficient 8:	<input type="text" value="0"/>
Coefficient 3:	<input type="text" value="0"/>	Coefficient 9:	<input type="text" value="0"/>
Coefficient 4:	<input type="text" value="0"/>		

Figure 50 Modify Polynomial Coefficient Calibrator Dialog

6.48 Add Set (Polynomial Coefficient Calibrator) Dialog

The Add Set dialog box shown in Figure 51 is used to add a set for a polynomial coefficient calibrator. It can be accessed by pushing the Add Set button on the Polynomial Coefficient Calibrator dialog box.



The 'Add Set' dialog box features a title bar with a close button. It contains two columns of input fields. The left column includes 'Degree' (0), 'Coefficient 0' (0), 'Coefficient 1' (0), 'Coefficient 2' (0), 'Coefficient 3' (0), and 'Coefficient 4' (0). The right column includes 'Coefficient 5' (0), 'Coefficient 6' (0), 'Coefficient 7' (0), 'Coefficient 8' (0), and 'Coefficient 9' (0). At the bottom are 'OK', 'Cancel', and 'Help' buttons.

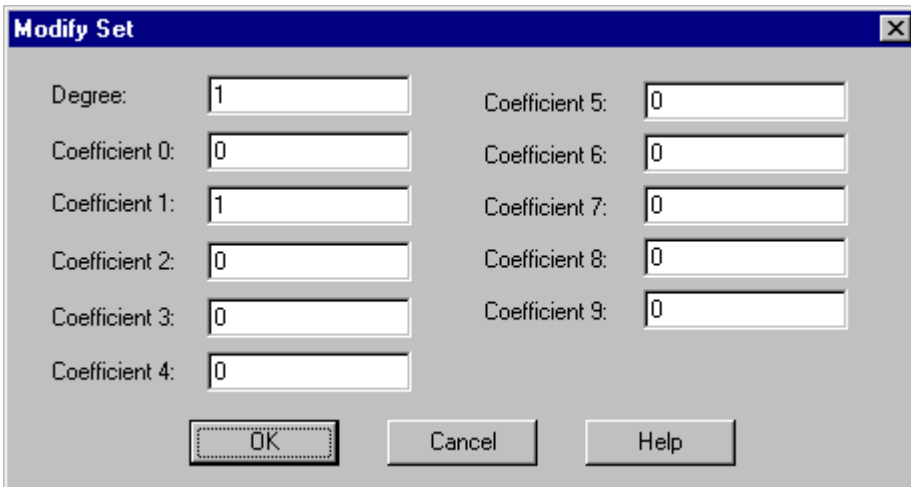
Degree:	0	Coefficient 5:	0
Coefficient 0:	0	Coefficient 6:	0
Coefficient 1:	0	Coefficient 7:	0
Coefficient 2:	0	Coefficient 8:	0
Coefficient 3:	0	Coefficient 9:	0
Coefficient 4:	0		

Buttons: OK, Cancel, Help

Figure 51 Add Set (Polynomial Coefficient Calibrator) Dialog

6.49 Modify Set (Polynomial Coefficient Calibrator) Dialog

The Modify Set dialog shown in Figure 52 is used to modify a set for a polynomial coefficient calibrator. It can be accessed by pushing the Modify Set button on the Polynomial Coefficient Calibrator dialog. This Modify Set dialog provides a way to modify an existing polynomial coefficient set for a specific calibrator. It will be populated with the data corresponding to the set you selected in the Polynomial Coefficient Calibrator dialog.



The 'Modify Set' dialog box features a title bar with a close button. It contains two columns of input fields. The left column includes 'Degree' (1), 'Coefficient 0' (0), 'Coefficient 1' (1), 'Coefficient 2' (0), 'Coefficient 3' (0), and 'Coefficient 4' (0). The right column includes 'Coefficient 5' (0), 'Coefficient 6' (0), 'Coefficient 7' (0), 'Coefficient 8' (0), and 'Coefficient 9' (0). At the bottom are 'OK', 'Cancel', and 'Help' buttons.

Degree:	1	Coefficient 5:	0
Coefficient 0:	0	Coefficient 6:	0
Coefficient 1:	1	Coefficient 7:	0
Coefficient 2:	0	Coefficient 8:	0
Coefficient 3:	0	Coefficient 9:	0
Coefficient 4:	0		

Buttons: OK, Cancel, Help

Figure 52 Modify Set (Polynomial Coefficient Calibrator) Dialog

6.50 Modify Description Dialog

The Modify Description dialog is shown in Figure 53. This dialog is used to modify the description associated with a particular processing element.

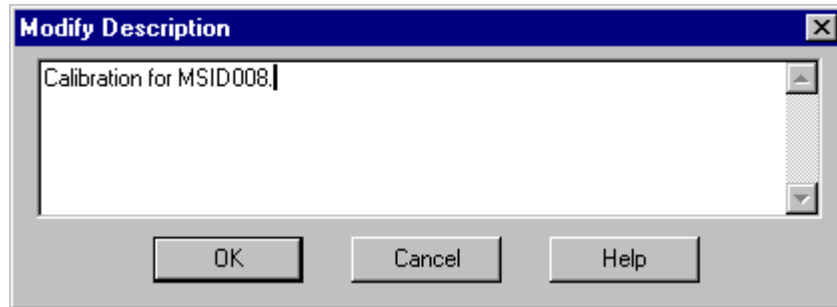


Figure 53 Modify Description Dialog

6.51 New Point Pair Calibrator Dialog

The New Point Pair Calibrator dialog is shown in Figure 54. This dialog will appear when the New button is pushed for a Point Pair calibrator. If New has been selected, then this dialog will be empty for the most part. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to add a new set push the Add Set button. Then once you have added a set, you can modify the set by selecting the set number using the Set Number combo box and then pushing the Modify Set button. This will bring up a Modify Set dialog that can be used to modify the set data.

You can sort the list of sequences by Sequence Number, Raw Count, or Engineering Value. To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

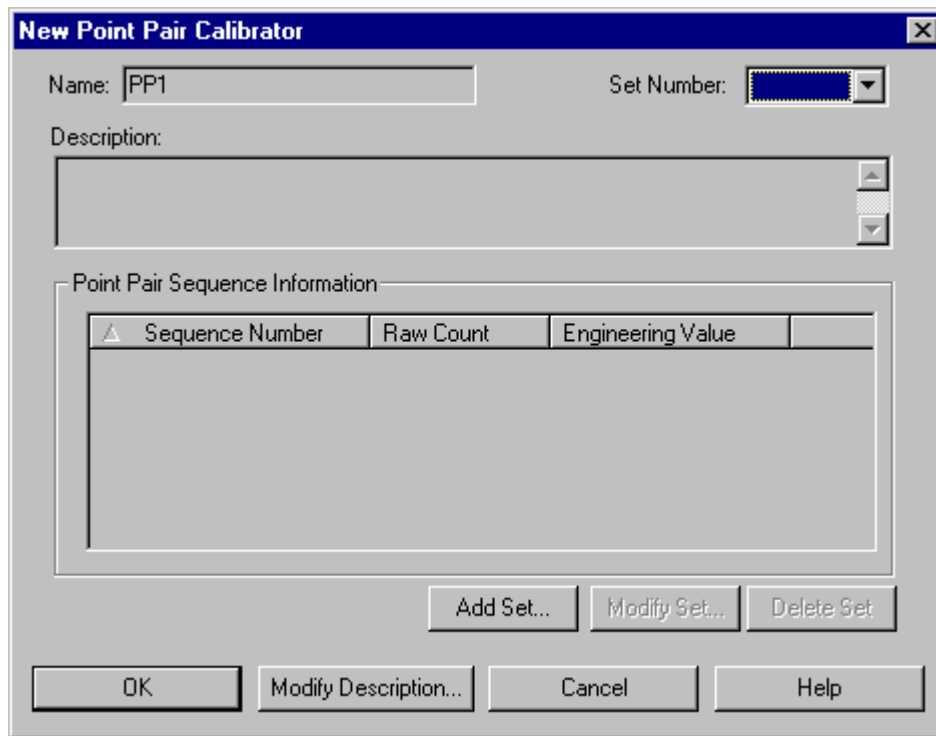


Figure 54 New Point Pair Calibrator Dialog

Each field in the New Point Pair Calibrator dialog is described below.

Name

The name of the calibrator.

Set Number

The set number field provides a way to select a particular set to view or modify.

Description

A description of the calibrator. The Modify Description button provides access to a dialog that can be used to modify the description.

Point Pair Sequence Information

The Point Pair Sequence Information section lists all the sequences in the point pair set.

Sequence Number

The sequence number associated with the sequence. The sequence number does not appear in the TReK Telemetry Database and is not used by the TReK telemetry processing software. It is shown in this dialog because it makes it easier to reference a particular sequence.

Raw Count

The Raw Count for the sequence.

Engineering Value

The Engineering Value for the sequence.

*Buttons*Add Set

When you push the Add Set button the dialog described in section 6.53 will be displayed. The Add Set dialog provides a way to add a new point pair set for the calibrator.

Modify Set

When you push the Modify Set button the dialog described in section 6.54 will be displayed. The Modify Set dialog provides a way to modify a point pair set in the calibrator.

Delete Set

When you push Delete Set, the currently selected set will be deleted. You will be asked to confirm that you want to delete the set since the delete action cannot be reversed. You cannot delete the last set.

Modify Description

When you push the Modify Description button the Modify Description dialog box will be displayed. This dialog box is used to modify the calibrator's description. It is described in section 6.50.

6.52 Modify Point Pair Calibrator Dialog

The Modify Point Pair Calibrator dialog is shown in Figure 55. This dialog will appear when the Modify button is pushed for a Point Pair Calibrator. If Modify has been selected, then the dialog will be populated with the calibrator's properties. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to modify a particular set, the set must be selected using the Set Number combo box and then the Modify Set button must be selected. This will bring up a Modify Set dialog that can be used to modify the set data. The Modify Point Pair Calibrator dialog works exactly like the New Point Pair Calibrator dialog which is described in section 6.51.

Modify Point Pair Calibrator

Name: Set Number:

Description:

Point Pair Sequence Information

Sequence Number	Raw Count	Engineering Value
1	-128	300
2	0	200
3	64	100
4	128	50

Figure 55 Modify Point Pair Calibrator Dialog

6.53 Add Set (Point Pair Calibrator) Dialog

The Add Set dialog shown in Figure 56 is used to add a set for a point pair calibrator. It can be accessed by pushing the Add Set button on the Point Pair Calibrator dialog. A Point Pair Calibrator set is comprised of point pair sequences. The Add Set dialog provides a way to add sequences, modify sequences, and delete sequences. The Modify Sequence and Delete Sequence buttons will be insensitive unless you have a sequence in the sequence list selected. Once a sequence has been selected these buttons will be available.

You can sort the list of sequences by Sequence Number, Raw Count, or Engineering Value. To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

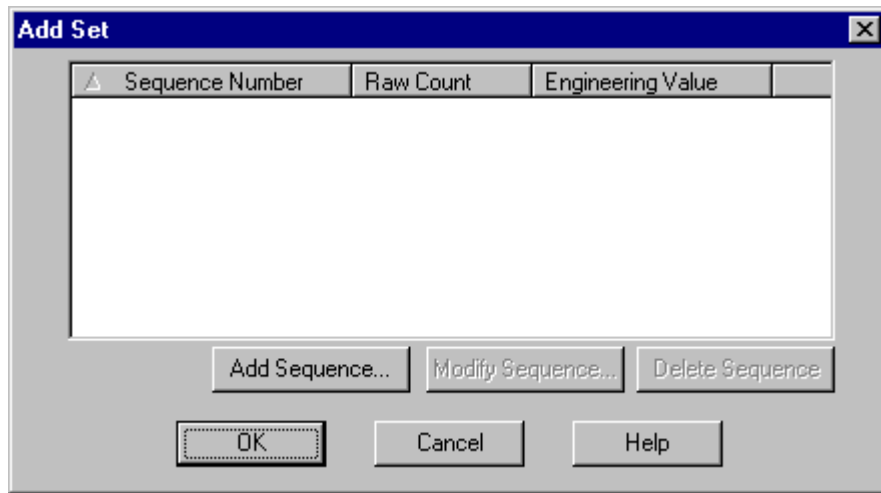


Figure 56 Add Set (Point Pair Calibrator) Dialog

6.54 Modify Set (Point Pair Calibrator) Dialog

The Modify Set dialog shown in Figure 57 is used to modify a set associated with a point pair calibrator. It can be accessed by pushing the Modify Set button on the Point Pair Calibrator dialog. The Modify Set dialog will be populated with the set that is selected in the Point Pair Calibrator dialog. A Point Pair Calibrator set is comprised of point pair sequences. The Modify Set dialog provides a way to add sequences, modify sequences, and delete sequences. The Modify Sequence and Delete Sequence buttons will be insensitive unless you have a sequence in the sequence list selected. Once a sequence has been selected these buttons will be available. When you push the Add Sequence button, the dialog described in section 6.55 is displayed. When you push the Modify Sequence button, the dialog described in section 6.56 is displayed.

You can sort the list of sequences by Sequence Number, Raw Count, or Engineering Value. To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

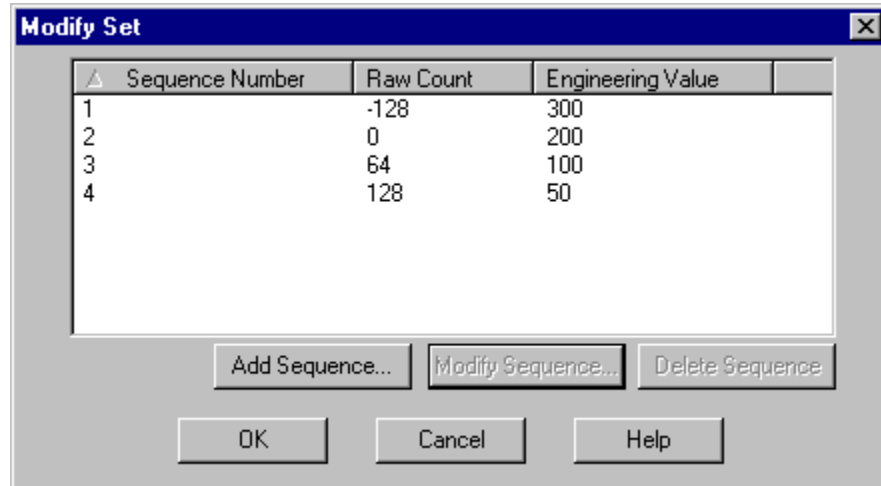


Figure 57 Modify Set (Point Pair Calibrator)

6.55 Add Sequence (Point Pair Calibrator Set) Dialog

The Add Sequence dialog shown in Figure 58 provides a way to add a new sequence to a point pair set.

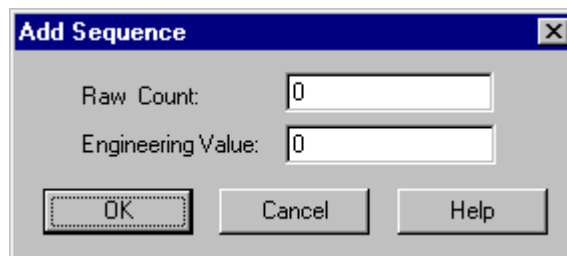


Figure 58 Add Sequence (Point Pair Sequence) Dialog

6.56 Modify Sequence (Point Pair Calibrator Set) Dialog

The Modify Sequence dialog shown in Figure 59 provides a way to modify a point pair sequence associated with a point pair set.

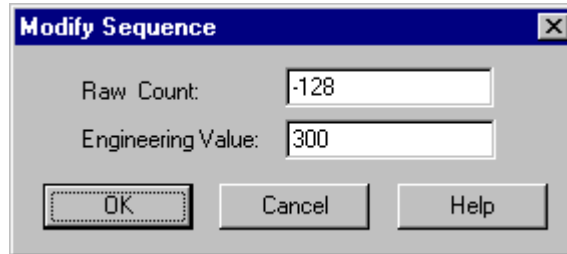
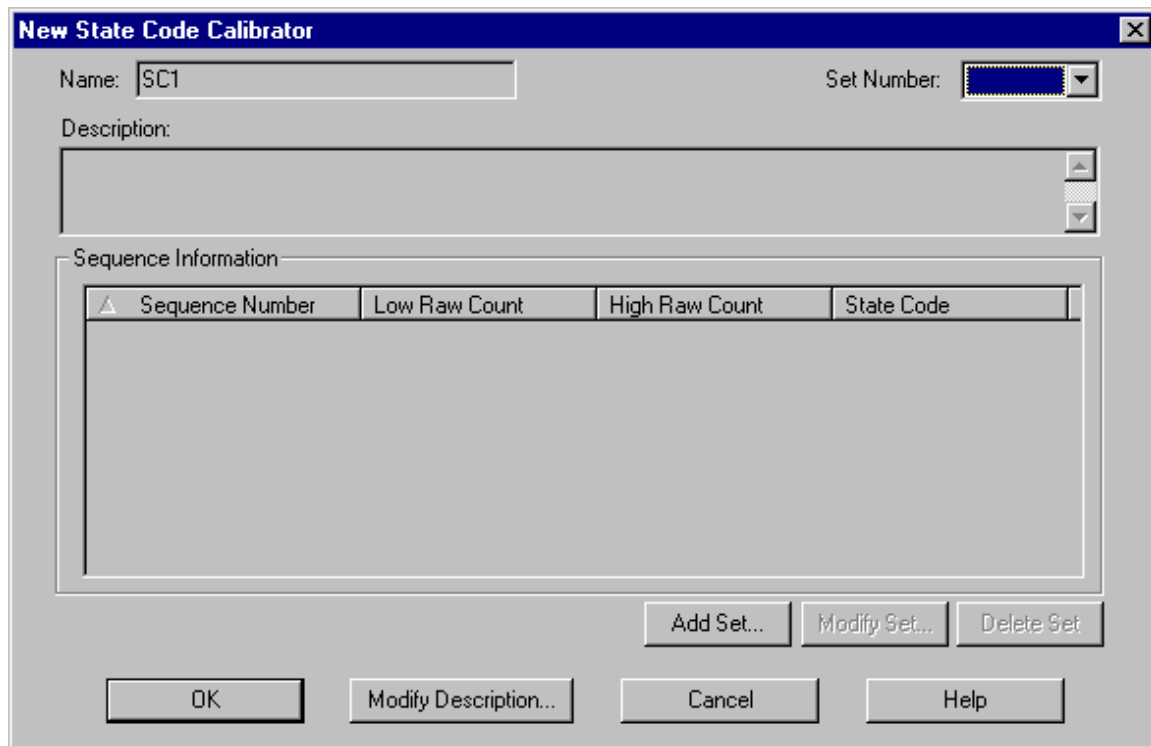


Figure 59 Modify Sequence (Point Pair Sequence) Dialog

6.57 New State Code Calibrator Dialog

The New State Code Calibrator dialog is shown in Figure 60. This dialog will appear when the New button is pushed for a State Code calibrator. If New has been selected, then this dialog will be empty for the most part. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to add a new set push the Add Set button. Then once you have added a set, you can modify the set by selecting the set number using the Set Number combo box and then pushing the Modify Set button. This will bring up a Modify Set dialog that can be used to modify the set data.

You can sort the list of sequences by Sequence Number, Low Raw Count, High Raw Count, or State Code. To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.



The dialog box is titled "New State Code Calibrator". It contains the following fields and controls:

- Name:** A text field containing "SC1".
- Set Number:** A dropdown menu.
- Description:** A large text area with scrollbars.
- Sequence Information:** A section containing a table with the following headers:

Sequence Number	Low Raw Count	High Raw Count	State Code
- Buttons:** "Add Set...", "Modify Set...", "Delete Set", "OK", "Modify Description...", "Cancel", and "Help".

Figure 60 New State Code Calibrator Dialog

Each field in the New State Code Calibrator dialog box is described below.

Name

The name of the calibrator.

Set Number

The set number field provides a way to select a particular set to view or modify.

Description

A description of the calibrator. The Modify Description button provides access to a dialog that can be used to modify the description.

State Code Sequence Information

The State Code Sequence Information section lists all the sequences in the state code set.

Sequence Number

The sequence number associated with the sequence. The sequence number does not appear in the TReK Telemetry Database and is not used by the TReK telemetry processing software. It is shown in this dialog because it makes it easier to reference a particular sequence.

Low Raw Count

The Low Raw Count for the sequence.

High Raw Count

The High Raw Count for the sequence.

State Code

The State Code for the sequence.

*Buttons*Add Set

When you push the Add Set button the dialog described in section 6.59 will be displayed. The Add Set dialog provides a way to add a new state code set for the calibrator.

Modify Set

When you push the Modify Set button the dialog described in section 6.60 will be displayed. The Modify Set dialog provides a way to modify a state code set in the calibrator.

Delete Set

When you push Delete Set, the currently selected set will be deleted. You will be asked to confirm that you want to delete the set since the delete action cannot be reversed. You cannot delete the last set.

Modify Description

When you push the Modify Description button the Modify Description dialog box will be displayed. This dialog box is used to modify the calibrator's description. It is described in section 6.50.

6.58 Modify State Code Calibrator Dialog

The Modify State Code Calibrator dialog is shown in Figure 61. This dialog will appear when the Modify button is pushed for a State Code calibrator. If Modify has been selected, then the dialog will be populated with the calibrator's properties. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to modify a particular set, the set must be selected using the Set Number combo box and

then the Modify Set button must be selected. This will bring up a Modify Set dialog that can be used to modify the set data. The Modify State Code Calibrator dialog works exactly like the New State Code Calibrator dialog which is described in section 6.57.

Sequence Number	Low Raw Count	High Raw Count	State Code
1	0	0	Off
2	1	10	Initializing
3	11	100	Executing
4	101	100000000	Complete

Figure 61 Modify State Code Calibrator Dialog

6.59 Add Set (State Code Calibrator) Dialog

The Add Set dialog shown in Figure 62 is used to add a set for a state code calibrator. It can be accessed by pushing the Add Set button on the State Code Calibrator dialog. A State Code Calibrator set is comprised of state code sequences. The Add Set dialog provides a way to add sequences, modify sequences, and delete sequences. The Modify Sequence and Delete Sequence buttons will be insensitive unless you have a sequence in the sequence list selected. Once a sequence has been selected these buttons will be available.

You can sort the list of sequences by Sequence Number, Low Raw Count, High Raw Count, or State Code. To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

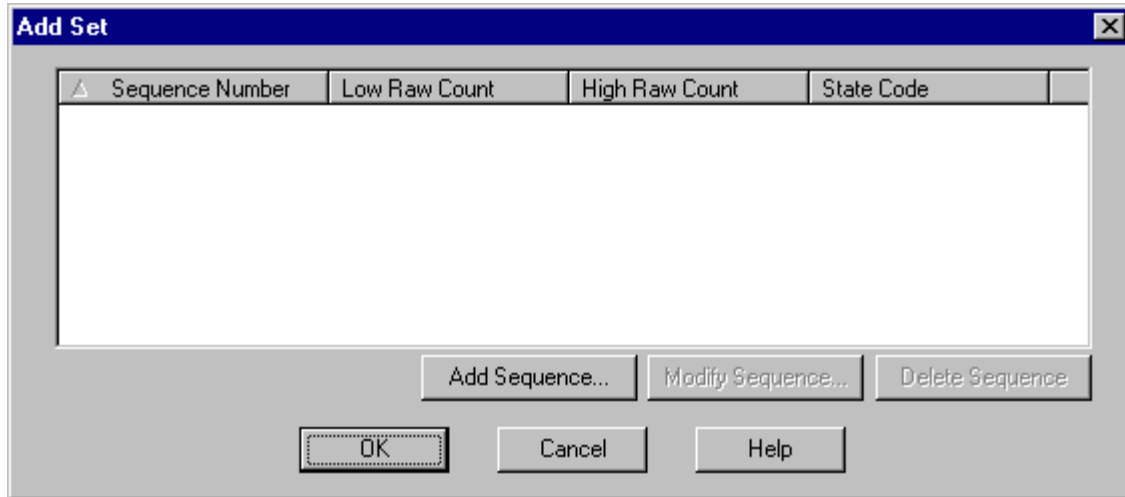


Figure 62 Add Set (State Code Calibrator) Dialog

6.60 Modify Set (State Code Calibrator) Dialog

The Modify Set dialog shown in Figure 63 is used to modify a set associated with a state code calibrator. It can be accessed by pushing the Modify Set button on the State Code Calibrator dialog. The Modify Set dialog will be populated with the set that is selected in the State Code Calibrator dialog. A State Code Calibrator set is comprised of state code sequences. The Modify Set dialog provides a way to add sequences, modify sequences, and delete sequences. The Modify Sequence and Delete Sequence buttons will be insensitive unless you have a sequence in the sequence list selected. Once a sequence has been selected these buttons will be available. When you push the Add Sequence button, the dialog described in section 6.61 is displayed. When you push the Modify Sequence button, the dialog described in section 6.62 is displayed.

You can sort the list of sequences by Sequence Number, Low Raw Count, High Raw Count, or State Code. To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

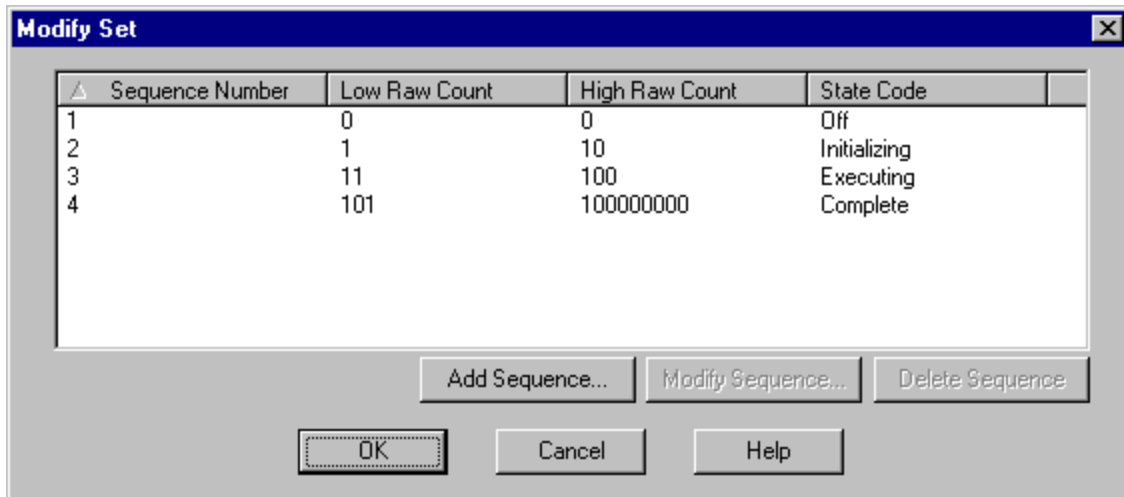


Figure 63 Modify Set (State Code Calibrator) Dialog

6.61 Add Sequence (State Code Calibrator Set) Dialog

The Add Sequence dialog shown in Figure 64 provides a way to add a new sequence to a state code set.

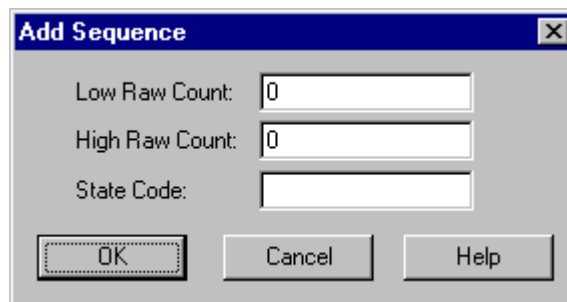


Figure 64 Add Sequence (State Code Calibrator Set) Dialog

6.62 Modify Sequence (State Code Calibrator Set) Dialog

The Modify Sequence dialog shown in Figure 65 provides a way to modify a state code sequence associated with a state code set.

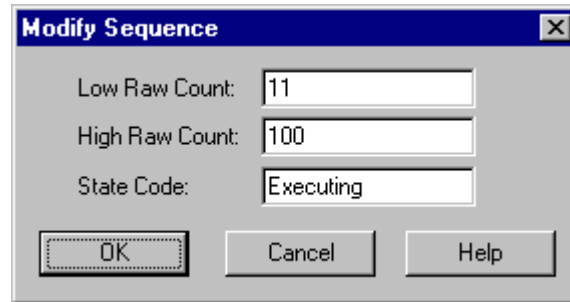


Figure 65 Modify Sequence (State Code Calibrator Set) Dialog

6.63 Sensors Dialog

The Sensors dialog is shown in Figure 66. This dialog shows a list of all the unique sensors currently in use or available for use. You can sort the list using Sensor Name, Sensor Type, or Description. To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

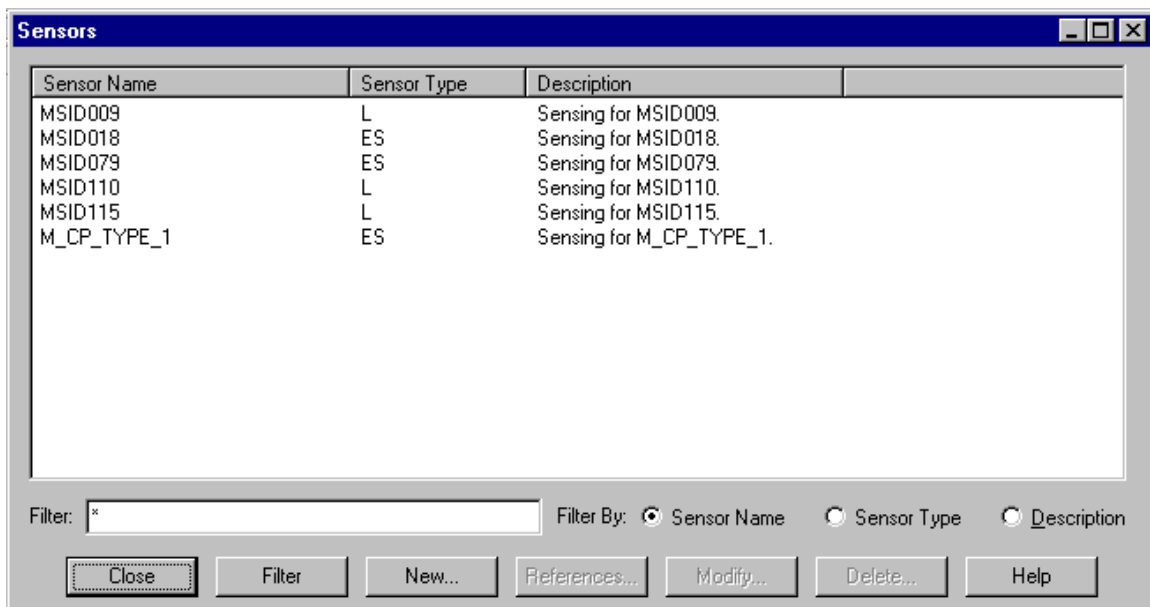


Figure 66 Sensors Dialog

Each column in the Sensors dialog is described below. The items in the list can be sorted based on column.

Sensor Name

The name of the sensor.

Sensor Type

The sensor's type. Valid types are: L (Limit) or ES (Expected State).

Description

A description of the sensor.

Dialog Buttons

There are several non-standard buttons on the Sensors dialog. Each is described below.

Filter

The Filter button along with the Filter field and Filter By radio buttons provide a way to filter the list of sensors. The Filter By radio buttons are used to indicate which column to use for the filter. The Filter field is used to specify the filter criteria. If you leave the Filter field blank all sensors will be listed. If you put a * in the Filter field all sensors will be listed. The * character can be used to match one or more characters and the ? character can be used to match a single character. For example MSID1* means match all the sensors that begin with the characters MSID1. MSID1?1 means match all the sensors that begin with the characters MSID1, followed by a single character, followed by the character 1.

Note: When a filter has two or more * characters, only the first * character will be interpreted as zero or more characters. The 2nd, 3rd, etc. instances of * will be interpreted as a literal * character. Since the Sensor Name field does not support * as a valid character, your filter will return no items in the list if it has more than one * character. The * is a valid character for the Description field and more than one * can be used in a filter for the Description field.

You can enter more than one ? character in a filter and each of them will be interpreted as any single character. However, all ? characters after the first * character are interpreted as literal ? characters.

New

The New button provides a way to create a new sensor. Once defined this sensor will be added to the list of available sensors. Once it is available it can be assigned to one or more measurements. If you save your configuration, any new sensors that were defined using this "New" capability will be saved with the configuration.

References

The References button provides access to the References dialog box. The References dialog box provides a way to see the list of measurements that are using the sensor. This is helpful in case you have forgotten which measurements are using the sensor. The

References dialog box is described in section 6.45. The References button will only be available when an item in the list is selected.

Modify

The Modify button provides access to a dialog box that can be used to view or modify properties associated with the sensor. The Modify button will only be available when an item in the list is selected.

Delete

The Delete button provides a way to delete a sensor. A sensor can only be deleted if it has no references. Therefore, it is not possible to delete a sensor that is in use. The Delete button will only be available when an item in the list is selected.

6.64 New Sensor Dialog

The New Sensor dialog is shown in Figure 67. This dialog is used to identify the type of sensor to create.

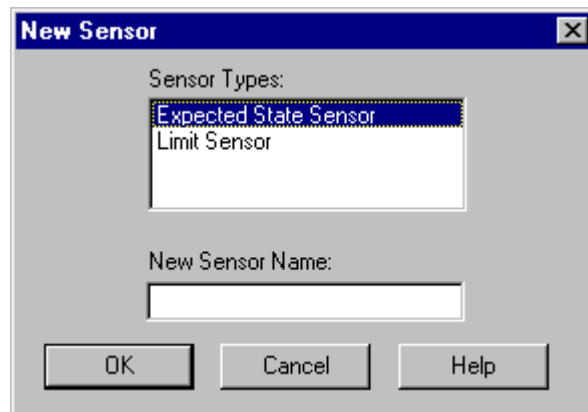


Figure 67 New Sensor Dialog

Each field in the New Sensor dialog box is described below:

Sensor Types

The Sensor Types field list the types of sensors that can be created.

New Sensor Name

The name to use for the new sensor.

6.65 New Limit Sensor Dialog

The New Limit Sensor dialog is shown in Figure 68. This dialog will appear when the New button is pushed for a Limit sensor. If New has been selected, then this dialog will be empty for the most part. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to add a new set push the Add Set button. Then once you have added a set, you can modify the set by selecting the set number using the Set Number combo box and then pushing the Modify Set button. This will bring up a Modify Set dialog that can be used to modify the set data.

The image shows a Windows-style dialog box titled "New Limit Sensor". It has a standard title bar with a close button (X). The dialog contains several input fields and buttons. At the top, there is a "Name:" label followed by a text box containing "LIMIT1". To the right of this is a "Set Number:" label followed by a dropdown menu. Below these is a "Description:" label followed by a large text area. Underneath the description area is a section titled "Limit Information" which contains five input fields: "Caution Low:", "Warning Low:", "Caution High:", "Warning High:", and "Delta Limit:". At the bottom of the dialog, there are two rows of buttons. The top row contains "Add Set...", "Modify Set...", and "Delete Set". The bottom row contains "OK", "Modify Description...", "Cancel", and "Help".

Figure 68 New Limit Sensor Dialog

Each field in the New Limit Sensor dialog box is described below.

Name

The name of the sensor.

Set Number

The set number field provides a way to select a particular set to view or modify.

Description

A description of the sensor. The Modify Description button provides access to a dialog that can be used to modify the description.

Limit Information

The Limit Information section contains information about each of the limits associated with one particular set.

Caution High

The Caution High Limit.

Caution Low

The Caution Low Limit

Warning High

The Warning High Limit

Warning Low

The Warning Low Limit

Delta Limit

The Delta Limit.

*Buttons*Add Set

When you push the Add Set button the Add Set dialog box described in section 6.67 will be displayed. This dialog provides a way to add a new limit set for the sensor.

Modify Set

When you push the Modify Set button the dialog box described in section 6.68 will be displayed. This dialog provides a way to modify an existing limit set for the sensor. It will be populated with the data corresponding to the set you selected in the Limit Sensor dialog.

Delete Set

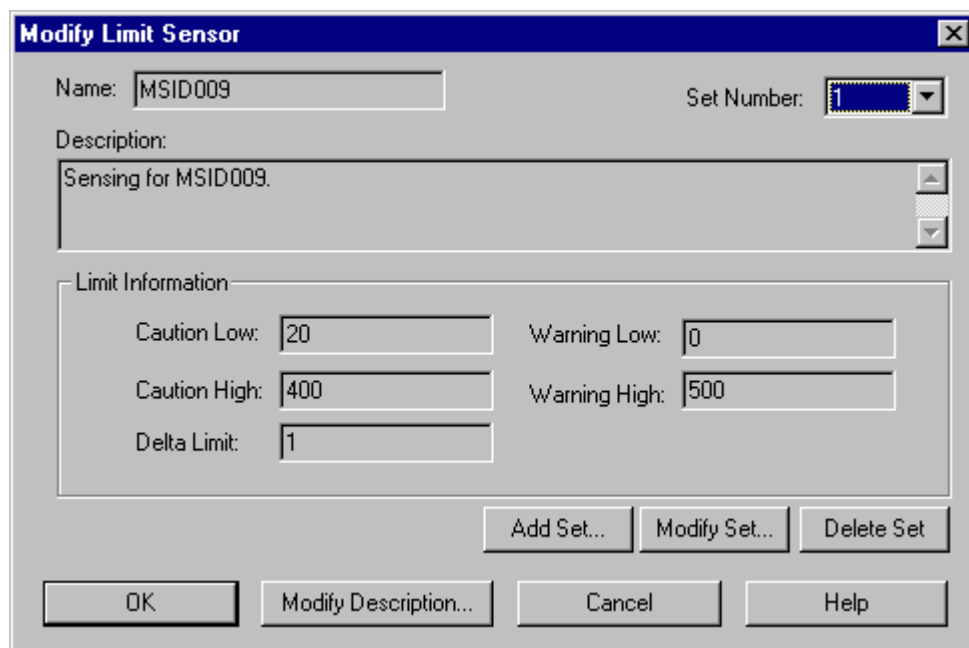
When you push Delete Set, the currently selected set will be deleted. You will be asked to confirm that you want to delete the set since the delete action cannot be reversed. You cannot delete the last set.

Modify Description

When you push the Modify Description button the Modify Description dialog box will be displayed. This dialog box is used to modify the sensor's description. It is described in section 6.50.

6.66 Modify Limit Sensor Dialog

The Modify Limit Sensor dialog is shown in Figure 69. This dialog will appear when the Modify button is pushed for a Limit sensor. If Modify has been selected, then the dialog will be populated with the sensor's properties. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to modify a particular set, the set must be selected using the Set Number combo box and then the Modify Set button must be selected. This will bring up a Modify Set dialog that can be used to modify the set data. The Modify Limit Sensor dialog works exactly like the New Limit Sensor dialog which is described in section 6.65.



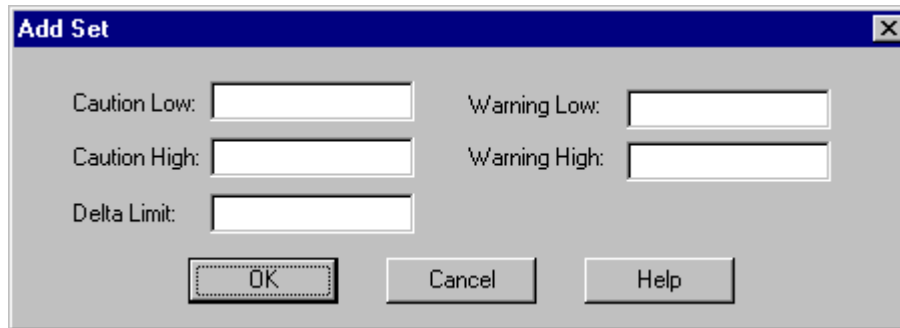
The screenshot shows a Windows-style dialog box titled "Modify Limit Sensor". It contains the following elements:

- Name:** A text field containing "MSID009".
- Set Number:** A dropdown menu showing "1".
- Description:** A text area containing "Sensing for MSID009." with scrollbars.
- Limit Information:** A section containing five text fields:
 - Caution Low: 20
 - Warning Low: 0
 - Caution High: 400
 - Warning High: 500
 - Delta Limit: 1
- Buttons:** A row of three buttons labeled "Add Set...", "Modify Set...", and "Delete Set". Below these are four buttons: "OK", "Modify Description...", "Cancel", and "Help".

Figure 69 Modify Limit Sensor Dialog

6.67 Add Set (Limit Sensor) Dialog

The Add Set dialog shown in Figure 70 is used to add a set for a limit sensor. It can be accessed by pushing the Add Set button on the Limit Sensor dialog.



The 'Add Set' dialog box has a title bar with a close button. It contains five input fields: 'Caution Low', 'Warning Low', 'Caution High', 'Warning High', and 'Delta Limit'. At the bottom are three buttons: 'OK', 'Cancel', and 'Help'.

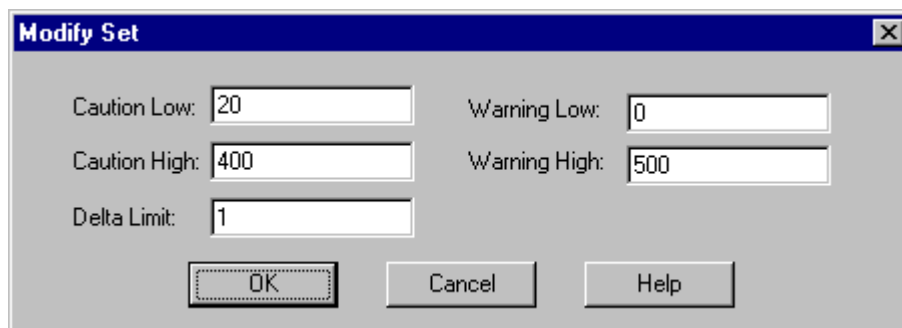
Caution Low:	<input type="text"/>	Warning Low:	<input type="text"/>
Caution High:	<input type="text"/>	Warning High:	<input type="text"/>
Delta Limit:	<input type="text"/>		

OK Cancel Help

Figure 70 Add Set (Limit Sensor) Dialog

6.68 Modify Set (Limit Sensor) Dialog

The Modify Set dialog shown in Figure 71 is used to modify a set associated with a limit sensor. It can be accessed by pushing the Modify Set button on the Limit Sensor dialog. It will be populated with the data for the set that was selected in the Limit Sensor dialog box.



The 'Modify Set' dialog box has a title bar with a close button. It contains five input fields with pre-filled values: 'Caution Low' (20), 'Warning Low' (0), 'Caution High' (400), 'Warning High' (500), and 'Delta Limit' (1). At the bottom are three buttons: 'OK', 'Cancel', and 'Help'.

Caution Low:	<input type="text" value="20"/>	Warning Low:	<input type="text" value="0"/>
Caution High:	<input type="text" value="400"/>	Warning High:	<input type="text" value="500"/>
Delta Limit:	<input type="text" value="1"/>		

OK Cancel Help

Figure 71 Modify Set (Limit Sensor) Dialog

6.69 New Expected State Sensor Dialog

The New Expected State Sensor dialog is shown in Figure 72. This dialog will appear when the New button is pushed for an Expected State sensor. If New has been selected, then this dialog will be empty for the most part. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to add a new set push the Add Set button. Then once you have added a set, you can modify the set by selecting the set number using the Set Number combo box and then pushing the Modify Set button. This will bring up a Modify Set dialog that can be used to modify the set data.

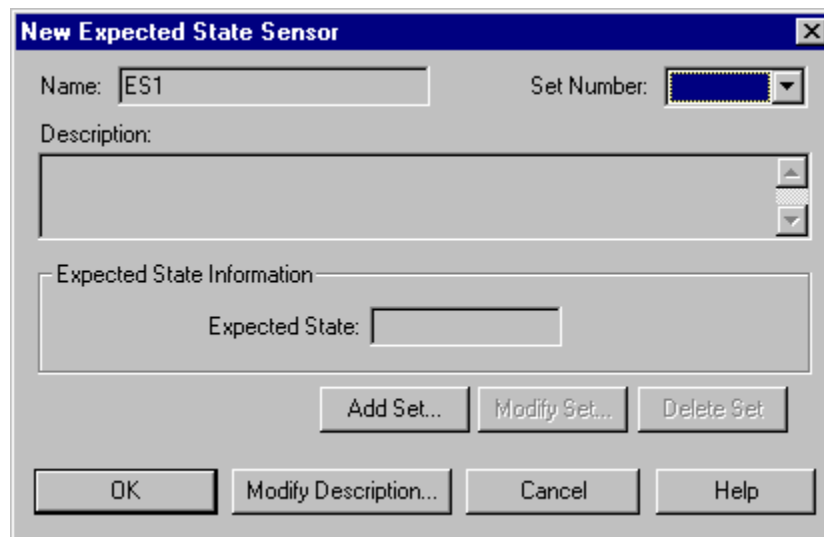


Figure 72 New Expected State Sensor Dialog

Each field in the New Expected State Sensor dialog box is described below.

Name

The name of the sensor.

Set Number

The set number field provides a way to select a particular set to view or modify.

Description

A description of the sensor. The Modify Description button provides access to a dialog that can be used to modify the description.

Expected State Information

The Expected State Information section contains information about each of the expected states associated with one particular set.

Expected State

The Expected State.

*Buttons*Add Set

When you push the Add Set button the Add Set dialog box described in section 6.71 will be displayed. This dialog provides a way to add a new expected state set for the sensor.

Modify Set

When you push the Modify Set button the dialog box described in section 6.72 will be displayed. This dialog provides a way to modify an existing expected state set for the sensor. It will be populated with the data corresponding to the set you selected in the Expected State Sensor dialog.

Delete Set

When you push Delete Set, the currently selected set will be deleted. You will be asked to confirm that you want to delete the set since the delete action cannot be reversed. You cannot delete the last set.

Modify Description

When you push the Modify Description button the Modify Description dialog box will be displayed. This dialog box is used to modify the sensor's description. It is described in section 6.50.

6.70 Modify Expected State Sensor Dialog

The Modify Expected State Sensor dialog is shown in Figure 73. This dialog will appear when the Modify button is pushed for an Expected State sensor. If Modify has been selected, then the dialog will be populated with the sensor's properties. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to modify a particular set, the set must be selected using the Set Number combo box and then the Modify Set button must be selected. This will bring up a Modify Set dialog that can be used to modify the set data. The Modify Expected State Sensor dialog works exactly like the New Expected State Sensor dialog which is described in section 6.69.

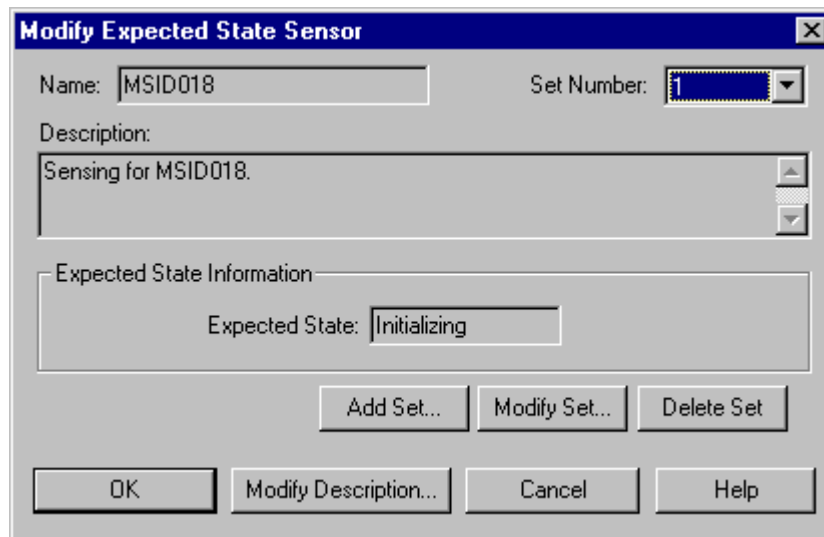


Figure 73 Modify Expected State Sensor Dialog

6.71 Add Set (Expected State Sensor) Dialog

The Add Set dialog shown in Figure 74 is used to add a set for an expected state sensor. It can be accessed by pushing the Add Set button on the Expected State Sensor dialog box.

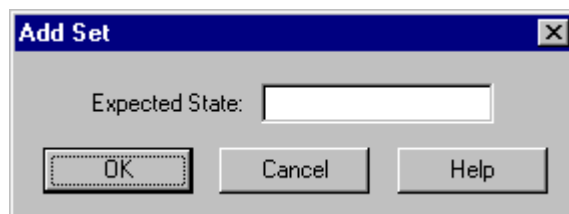


Figure 74 Add Set (Expected State Sensor) Dialog

6.72 Modify Set (Expected State Sensor) Dialog

The Modify Set dialog shown in Figure 75 is used to modify a set associated with a expected state sensor. It can be accessed by pushing the Modify Set button on the Expected State Sensor dialog. It will be populated with the data for the set that was selected in the Expected State Sensor dialog.

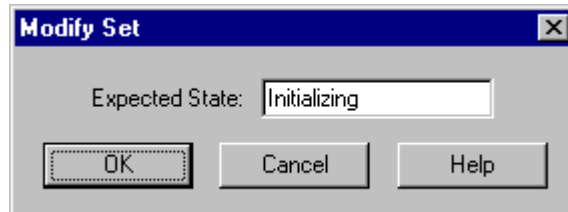


Figure 75 Modify Set (Expected State Sensor) Dialog

6.73 Switches Dialog

The Switches dialog is shown in Figure 76. This dialog shows a list of all the unique switches currently in use or available for use. You can sort the list using Switch Name, Switch Type, or Description. To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

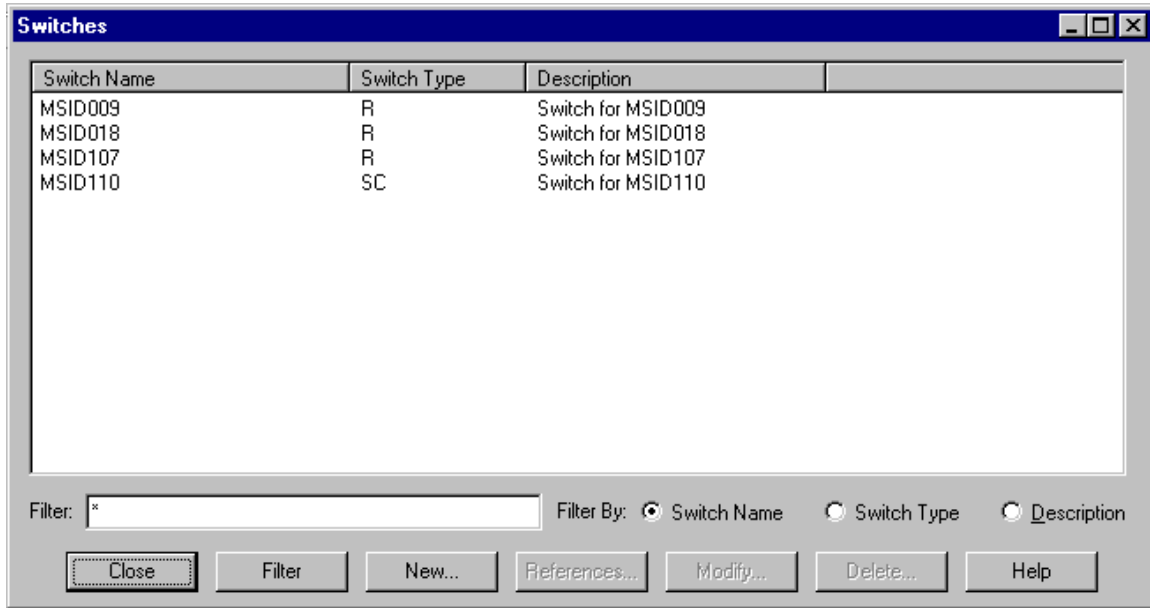


Figure 76 Switches Dialog

Each column in the Switches dialog is described below. The items in the list can be sorted based on column.

Switch Name

The name of the switch.

Switch Type

The switch's type. Valid types are: R (Range) or SC (State Code).

Description

A description of the switch.

Dialog Buttons

There are several non-standard buttons on the Switches dialog box. Each is described below.

Filter

The Filter button along with the Filter field and Filter By radio buttons provide a way to filter the list of switches. The Filter By radio buttons are used to indicate which column to use for the filter. The Filter field is used to specify the filter criteria. If you leave the Filter field blank all switches will be listed. If you put a * in the Filter field all switches will be listed. The * character can be used to match one or more characters and the ? character can be used to match a single character. For example MSID1* means match all the switches that begin with the characters MSID1. MSID1?1 means match all the

switches that begin with the characters MSID1, followed by a single character, followed by the character 1.

Note: When a filter has two or more * characters, only the first * character will be interpreted as zero or more characters. The 2nd, 3rd, etc. instances of * will be interpreted as a literal * character. Since the Switch Name field does not support * as a valid character, your filter will return no items in the list if it has more than one * character. The * is a valid character for the Description field and more than one * can be used in a filter for the Description field.

You can enter more than one ? character in a filter and each of them will be interpreted as any single character . However, all ? characters after the first * character are interpreted as literal ? characters.

New

The New button provides a way to create a new switch. Once defined this switch will be added to the list of available switches. Once it is available it can be assigned to one or more measurements. If you save your configuration, any new switches that were defined using this “New” capability will be saved with the configuration.

References

The References button provides access to the References dialog box. The References dialog box provides a way to see the list of measurements that are using the switch. This is helpful in case you have forgotten which measurements are using the switch. The References dialog box is described in section 6.45. The References button will only be available when an item in the list is selected.

Modify

The Modify button provides access to a dialog box that can be used to view or modify properties associated with the switch. The Modify button will only be available when an item in the list is selected.

Delete

The Delete button provides a way to delete a switch. A switch can only be deleted if it has no references. Therefore, it is not possible to delete a switch that is in use. The Delete button will only be available when an item in the list is selected.

6.74 New Switch Dialog

The New Switch dialog is shown in Figure 77. This dialog is used to identify the type of switch to create.

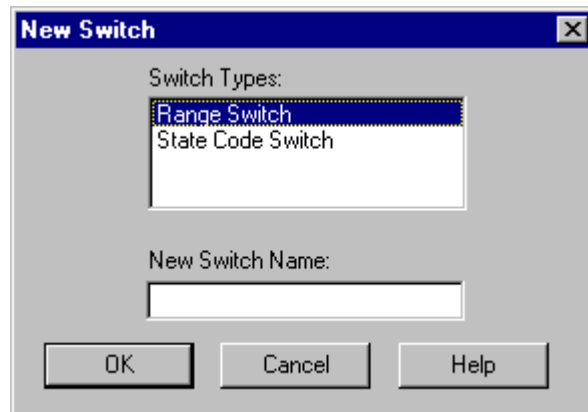


Figure 77 New Switch Dialog

Each field in the New Switch dialog is described below:

Switch Types

The Switch Types field lists the types of switches that can be created.

New Switch Name

The name to use for the new switch.

6.75 New Range Switch Dialog

The New Range Switch dialog is shown in Figure 78. This dialog will appear when the New button is pushed for a Range switch in the Switches dialog. If New has been selected, then this dialog will be empty for the most part. The fields in this dialog are all read-only. This dialog box is a little different than the other processing dialogs. This is because switches are not used individually, they are used in conjunction with other processing elements such as calibrators and sensors. Please see section 6.76 for more information about working with range switches.

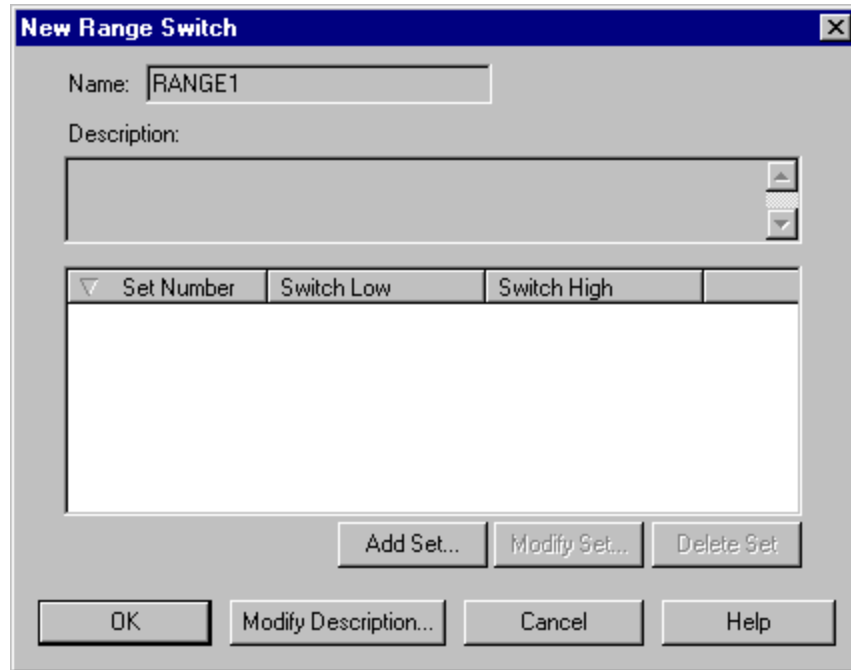


Figure 78 New Range Switch Dialog

Each field in the New Range Switch dialog is described below.

Name

The name of the switch.

Description

A description of the switch. The Modify Description button provides access to a dialog that can be used to modify the description.

The list shows three columns of information that provide information about the mapping between sets and ranges.

Set Number

The set number to use when the value is within the range indicated by the Switch Low and Switch High values.

Switch Low

The Switch Low value.

Switch High

The Switch High value.

Buttons

Add Set

When you push the Add Set button the Add Set dialog box described in section 6.77 will be displayed. This dialog provides a way to add a set – range mapping for the switch.

Modify Set

When you push the Modify Set button the dialog box described in section 6.78 will be displayed. This dialog provides a way to modify an existing set – range mapping for the switch. It will be populated with the data corresponding to the set you selected in the Range Switch dialog. The Modify Set button will not be available unless a row in the list is selected.

Delete Set

When you push Delete Set, the currently selected set will be deleted. You will be asked to confirm that you want to delete the set since the delete action cannot be reversed. The Delete Set button will not be available unless a row in the list has been selected. You cannot delete the last set.

Modify Description

When you push the Modify Description button the Modify Description dialog box will be displayed. This dialog box is used to modify the switches' description. It is described in section 6.50.

6.76 Modify Range Switch Dialog

The Modify Range Switch dialog is shown in Figure 79. This dialog will appear when the Modify button is pushed for a Range Switch. If Modify has been selected, then the dialog will be populated with the switches properties. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively.

This dialog is a little different than the other processing dialogs. This is because switches are not used individually, they are used in conjunction with other processing elements such as calibrators and sensors. The Add Set, Modify Set, and Delete Set buttons are used to add a set, modify an existing set, or delete an existing set respectively. However, the sets in the case of a switch are referring to the sets associated with a calibrator or a sensor to which the switch is assigned. For example, in Figure 79 the list shows the following mappings:

When the Range is 0 – 256	Use Set Number 1 when range > 0 and range <= 256
When the Range is 256 – 1024	Use Set Number 2 when range > 256 and range <= 1024
When the Range is 1024 – 65535	Use Set Number 3 when range > 1024 and range <= 65535

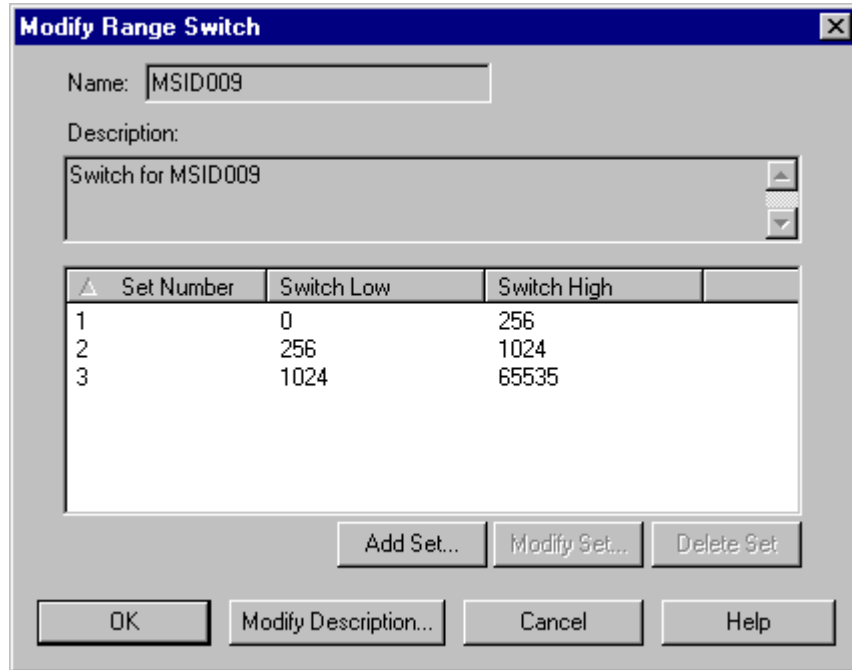


Figure 79 Modify Range Switch Dialog

The New and Modify Range Switch dialogs provide a way for you to identify which set should be used for a particular range of values. When you select Add Set, you will be able to add a new range for the next set not currently listed. Therefore, if there are no sets in the list, and you choose Add Set then you will be adding the range that corresponds to Set 1. Once a range for Set 1 is added, if you select Add Set again, you will be able to add a range for the next set which is Set 2. When you create or modify a Range Switch you should have some knowledge about which calibrator or sensor you plan to use the switch with and how many sets are defined for that calibrator or sensor. There is a one-to-one correspondence between the number of sets in the calibrator or sensor and the number of sets/ranges defined in the Range Switch. The one-to-one correspondence check will not be done when you create a new switch or modify an existing switch. This check is done when you assign the switch to a particular parameter in the Modify Parameter dialog.

When adding sets or modifying sets you will not be able to control the set number. If you happen to enter the wrong range for a set you can use the Modify Set dialog to correct this. The Modify Set dialog provides a way to map a particular range to a particular set. You can select the row for the set that needs to be corrected, and then modify the range for that particular set.

The Modify Range Switch dialog works exactly like the New Range Switch dialog which is described in section 6.75.

6.77 Add Set (Range Switch) Dialog

The Add Set dialog shown in Figure 80 is used to add a set – range mapping for a range switch. It can be accessed by pushing the Add Set button on the Range Switch dialog.

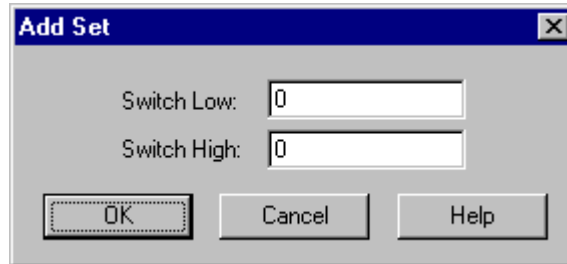


Figure 80 Add Set (Range Switch) Dialog

6.78 Modify Set (Range Switch) Dialog

The Modify Set dialog shown in Figure 81 is used to modify a set – range mapping for a range switch. It can be accessed by pushing the Modify Set button on the Range Switch dialog. It will be populated with the data for the set that was selected in the Range Switch dialog.

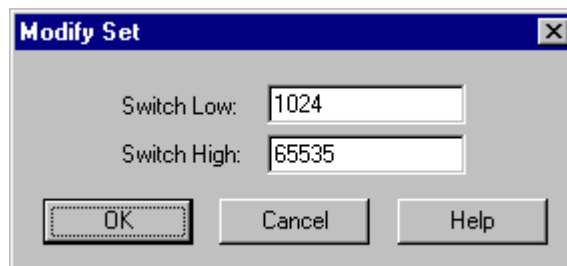


Figure 81 Modify Set (Range Switch) Dialog

6.79 New State Code Switch Dialog

The New State Code Switch dialog is shown in Figure 82. This dialog will appear when the New button is pushed for a State Code switch in the Switches dialog. If New has been selected, then this dialog will be empty for the most part. The fields in this dialog are all read-only. This dialog box is a little different than the other processing dialogs. This is because switches are not used individually, they are used in conjunction with other processing elements such as calibrators and sensors. Please see section 6.80 for more information about working with state code switches.

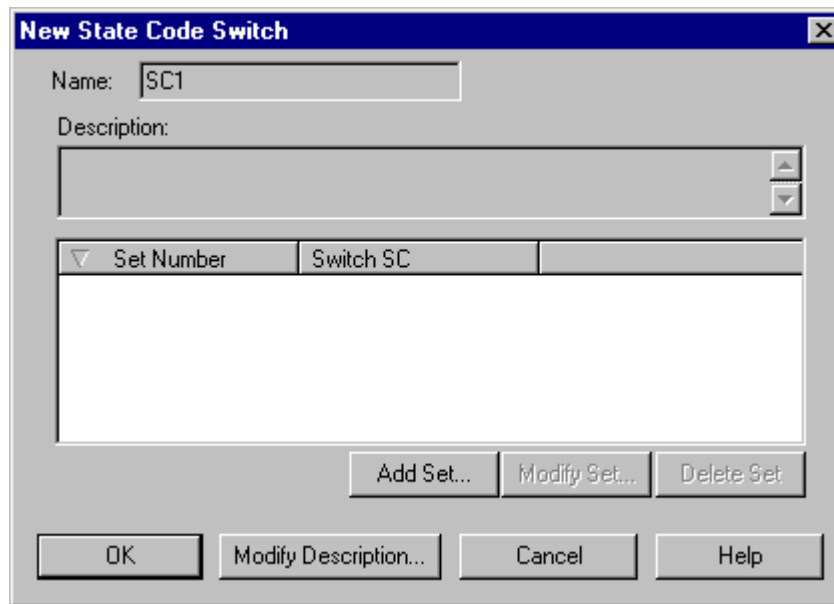


Figure 82 New State Code Switch Dialog

Each field in the New State Code Switch dialog is described below.

Name

The name of the switch.

Description

A description of the switch. The Modify Description button provides access to a dialog that can be used to modify the description.

The list shows two columns of information that provide information about the mapping between sets and state codes.

Set Number

The set number to use when the state code matches the state code identified in the Switch SC column.

Switch SC

The State Code to use as the switch.

*Buttons*Add Set

When you push the Add Set button the Add Set dialog box described in section 6.81 will be displayed. This dialog provides a way to add a set – state code mapping for the switch.

Modify Set

When you push the Modify Set button the dialog box described in section 6.82 will be displayed. This dialog provides a way to modify an existing set – state code mapping for the switch. It will be populated with the data corresponding to the set you selected in the State Code Switch dialog. The Modify Set button will not be available unless a row in the list is selected.

Delete Set

When you push Delete Set, the currently selected set will be deleted. You will be asked to confirm that you want to delete the set since the delete action cannot be reversed. The Delete Set button will not be available unless a row in the list has been selected. You cannot delete the last set.

Modify Description

When you push the Modify Description button the Modify Description dialog box will be displayed. This dialog box is used to modify the switch's description. It is described in section 6.50.

6.80 Modify State Code Switch Dialog

The Modify State Code Switch dialog is shown in Figure 83. This dialog will appear when the Modify button is pushed for a State Code Switch. If Modify has been selected, then the dialog will be populated with the switch's properties. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively.

This dialog is a little different than the other processing dialogs. This is because switches are not used individually, they are used in conjunction with other processing elements such as calibrators and sensors. The Add Set, Modify Set, and Delete Set buttons are used to add a set, modify an existing set, or delete an existing set respectively. However, the sets in the case of a switch are referring to the sets associated with a calibrator or a sensor to which the switch is assigned. For example, in Figure 83 the list shows the following mappings:

When the State Code is Executing	Use Set Number 1
When the State Code is Initializing	Use Set Number 2

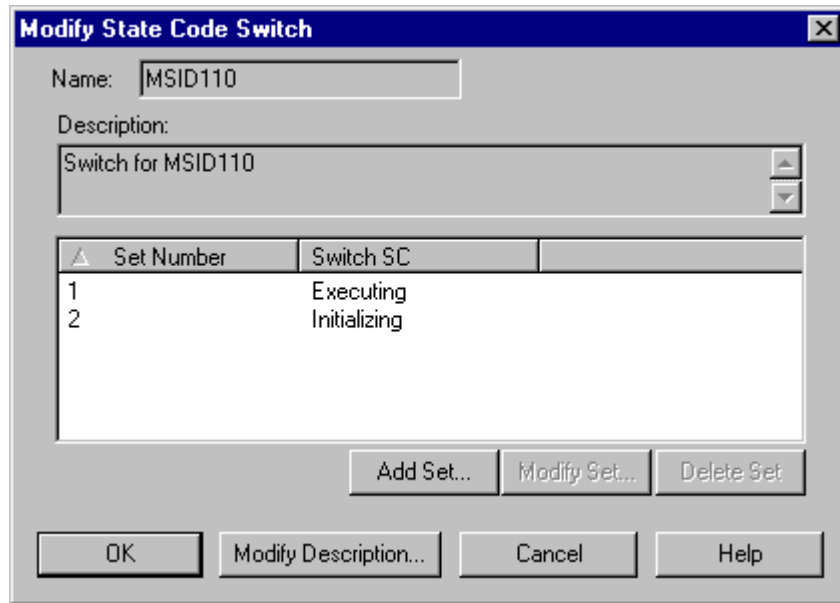


Figure 83 Modify State Code Switch Dialog

When adding sets or modifying sets you will not be able to control the set number. If you happen to enter the wrong state code for a set you can use the Modify Set dialog to correct this. The Modify Set dialog provides a way to map a particular state code to a particular set. You can select the row for the set that needs to be corrected, and then modify the state code for that particular set.

The Modify State Code Switch dialog works exactly like the New State Code Switch dialog which is described in section 6.79.

When you create or modify a State Code Switch you should have some knowledge about which calibrator or sensor you plan to use the switch with and how many sets are defined for that calibrator or sensor. There is a one-to-one correspondence between the number of sets in the calibrator or sensor and the number of sets/state codes defined in the State Code Switch. The one-to-one correspondence check will not be done when you create a new switch or modify an existing switch. This check is done when you assign the switch to a particular parameter in the Modify Parameter dialog.

6.81 Add Set (State Code Switch) Dialog

The Add Set dialog shown in Figure 84 is used to add a set – state code mapping for a state code switch. It can be accessed by pushing the Add Set button on the State Code Switch dialog.

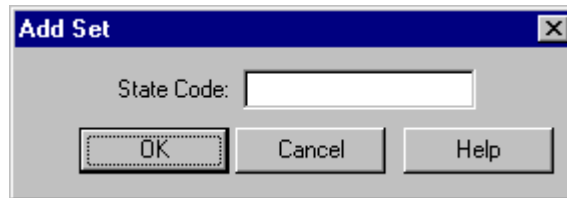


Figure 84 Add Set (State Code Switch) Dialog

6.82 Modify Set (State Code Switch) Dialog

The Modify Set dialog shown in Figure 85 is used to modify a set – state code mapping for a state code switch. It can be accessed by pushing the Modify Set button on the State Code Switch dialog. It will be populated with the data for the set that was selected in the State Code Switch dialog.

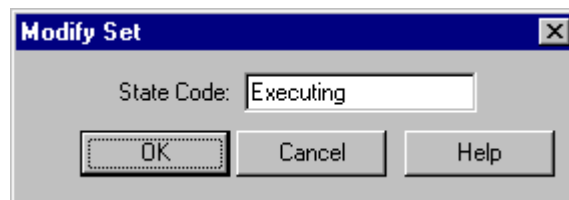


Figure 85 Modify Set (State Code Switch) Dialog

6.83 Monitors Dialog

The Monitors dialog is shown in Figure 86. This dialog shows a list of all the unique monitors currently in use or available for use. You can sort the list using Monitor Name, Monitor Type, or Description. To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

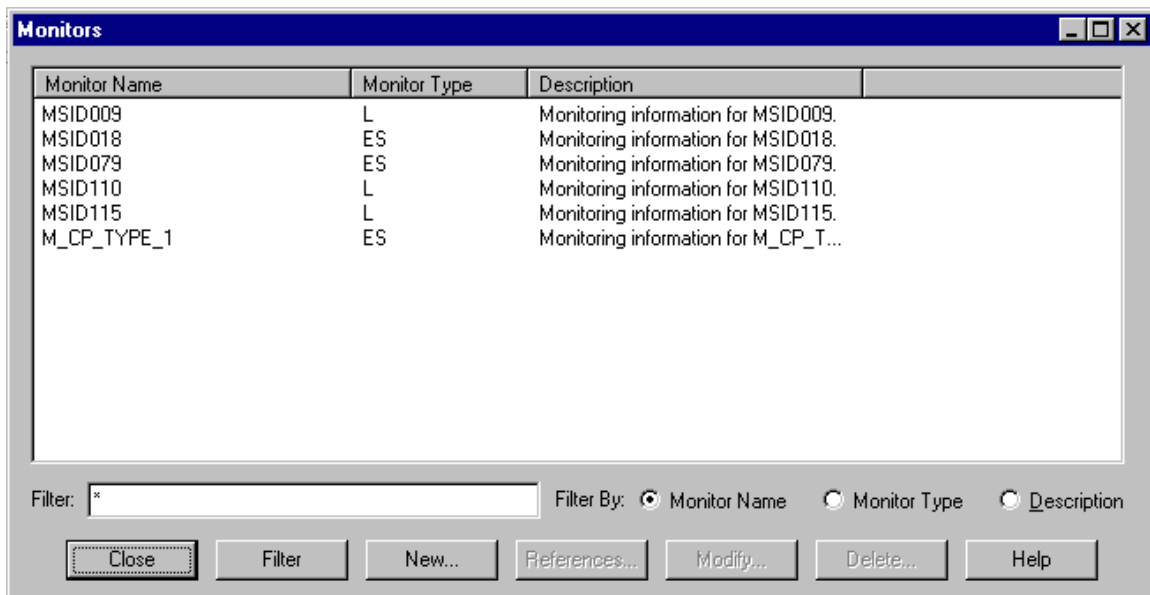


Figure 86 Monitors Dialog

Each column in the Monitors dialog is described below. The items in the list can be sorted based on column.

Monitor Name

The name of the monitor.

Monitor Type

The monitor's type. Types that may appear include: L (Limit) or ES (Expected State).

Description

A description of the monitor.

Dialog Buttons

There are several non-standard buttons on the Monitors dialog box. Each is described below.

Filter

The Filter button along with the Filter field and Filter By radio buttons provide a way to filter the list of monitors. The Filter By radio buttons are used to indicate which column to use for the filter. The Filter field is used to specify the filter criteria. If you leave the Filter field blank all monitors will be listed. If you put a * in the Filter field all monitors will be listed. The * character can be used to match one or more characters and the ? character can be used to match a single character. For example MSID1* means match all the monitors that begin with the characters MSID1. MSID1?1 means match all the monitors that begin with the characters MSID1, followed by a single character, followed by the character 1.

Note: When a filter has two or more * characters, only the first * character will be interpreted as zero or more characters. The 2nd, 3rd, etc. instances of * will be interpreted as a literal * character. Since the Monitor Name field does not support * as a valid character, your filter will return no items in the list if it has more than one * character. The * is a valid character for the Description field and more than one * can be used in a filter for the Description field.

You can enter more than one ? character in a filter and each of them will be interpreted as any single character. However, all ? characters after the first * character are interpreted as literal ? characters.

New

The New button provides a way to create a new monitor. Once defined this monitor will be added to the list of available monitors. Once it is available it can be assigned to one or more measurements. If you save your configuration, any new monitors that were defined using this “New” capability will be saved with the configuration.

References

The References button provides access to the References dialog box. The References dialog box provides a way to see the list of measurements that are using the monitor. This is helpful in case you have forgotten which measurements are using the monitor. The References dialog box is described in section 6.45. The References button will only be available when an item in the list is selected.

Modify

The Modify button provides access to a dialog box that can be used to view or modify properties associated with the monitor. The Modify button will only be available when an item in the list is selected.

Delete

The Delete button provides a way to delete a monitor. A monitor can only be deleted if it has no references. Therefore, it is not possible to delete a monitor that is in use. The Delete button will only be available when an item in the list is selected.

6.84 New Monitor Dialog

The New Monitor dialog is shown in Figure 87. This dialog is used to identify the type of monitor to create.

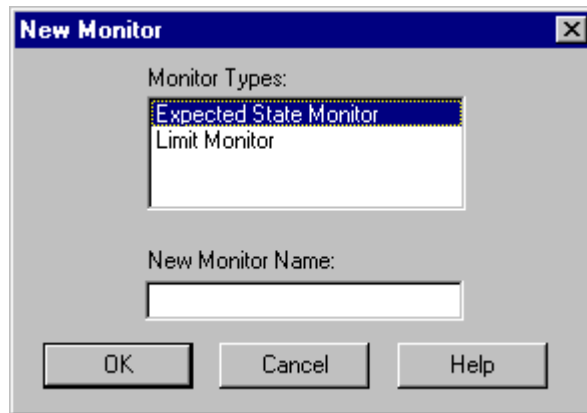


Figure 87 New Monitor Dialog

Each field in the New Monitor dialog is described below:

Monitor Types

The Monitor Types field list the types of monitors that can be created.

New Monitor Name

The name to use for the new monitor.

6.85 New Limit Monitor Dialog

The New Limit Monitor dialog is shown in Figure 88. This dialog will appear when the New button is pushed for a Limit Monitor. If New has been selected, then this dialog will be empty for the most part. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to add a new set push the Add Set button. Then once you have added a set, you can modify the set by selecting the set number using the Set Number combo box and then pushing the Modify Set button. This will bring up a Modify Set dialog that can be used to modify the set data.

New Limit Monitor

Name: Set Number:

Description:

Message Information

Number of Samples To Use: ☐ First ☐ All Tolerance:

Caution Low Message:

Caution High Message:

Warning Low Message:

Warning High Message:

Delta Message:

OK Message:

Add Set... Modify Set... Delete Set

OK Modify Description... Cancel Help

Figure 88 New Limit Monitor Dialog

Each field in the New Limit Monitor dialog is described below.

Name

The name of the monitor.

Set Number

The set number field provides a way to select a particular set to view or modify.

Description

A description of the monitor. The Modify Description button provides access to a dialog that can be used to modify the description.

Message Information

The Message Information section contains information about each of the messages associated with one particular set.

Number of Samples to Use

The number of samples to use when performing the monitoring. First indicates that only the first sample will be used. All indicates that all samples will be used.

Tolerance

The Tolerance indicates the number of violations to allow before switching states. The tolerance does not apply to the delta limit.

Caution Low Message

The message to generate for a Caution Low condition.

Caution High Message

The message to generate for a Caution High condition.

Warning Low Message

The message to generate for a Warning Low condition.

Warning High Message

The message to generate for a Warning High condition.

Delta Message

The message to generate for a Delta condition.

OK Message

The message to generate when conditions return to normal.

Buttons

Add Set

When you push the Add Set button the Add Set dialog box described in section 6.87 will be displayed. This dialog provides a way to add a new limit message set for the monitor.

Modify Set

When you push the Modify Set button the dialog box described in section 6.88 will be displayed. This dialog provides a way to modify an existing limit message set for the monitor. It will be populated with the data corresponding to the set you selected in the Limit Monitor dialog.

Delete Set

When you push Delete Set, the currently selected set will be deleted. You will be asked to confirm that you want to delete the set since the delete action cannot be reversed. You cannot delete the last set.

Modify Description

When you push the Modify Description button the Modify Description dialog box will be displayed. This dialog box is used to modify the monitor's description. It is described in section 6.50.

6.86 Modify Limit Monitor Dialog

The Modify Limit Monitor dialog is shown in Figure 89. This dialog box will appear when the Modify button is pushed for a Limit monitor. If Modify has been selected, then the dialog will be populated with the monitor's properties. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to modify a particular set, the set must be selected using the Set Number combo box and then the Modify Set button must be selected. This will bring up a Modify Set dialog that can be used to modify the set data. The Modify Limit Monitor dialog works exactly like the New Limit Monitor dialog which is described in section 6.85.

Modify Limit Monitor

Name: Set Number:

Description:

Message Information

Number of Samples To Use: ☐ First ☒ All Tolerance:

Caution Low Message:

Caution High Message:

Warning Low Message:

Warning High Message:

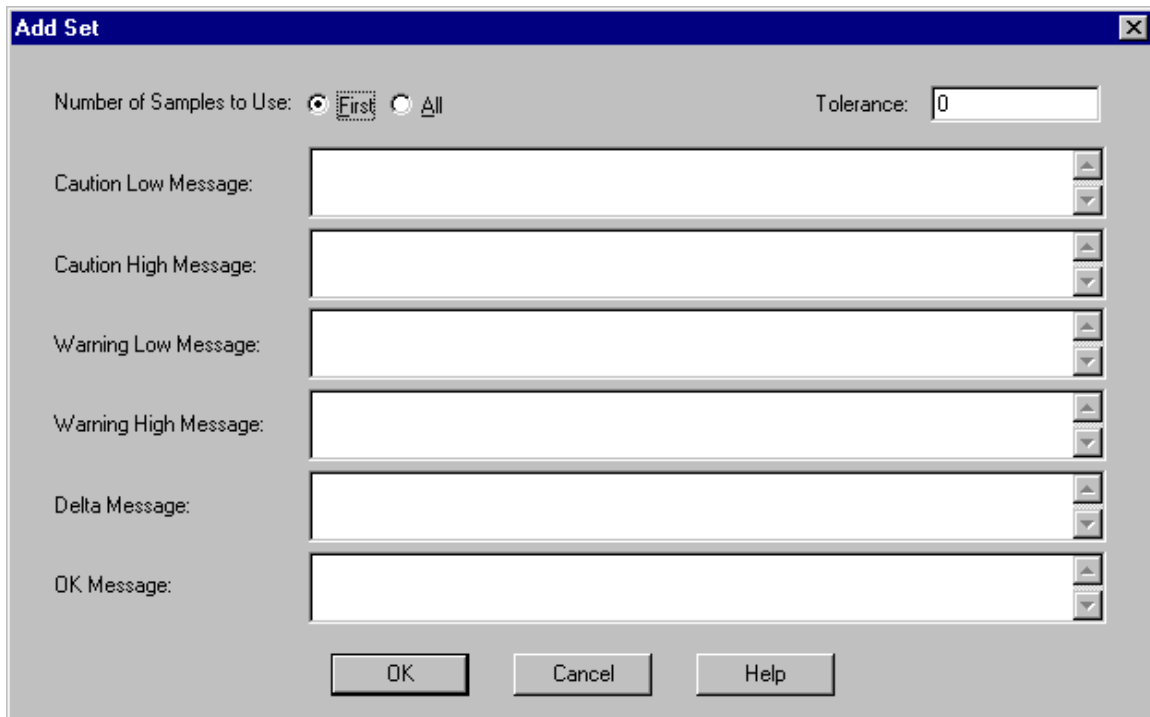
Delta Message:

OK Message:

Figure 89 Modify Limit Monitor Dialog

6.87 Add Set (Limit Monitor) Dialog

The Add Set dialog shown in Figure 90 is used to add a set for a limit monitor. It can be accessed by pushing the Add Set button on the Limit Monitor dialog.



The dialog box is titled "Add Set" and has a close button (X) in the top right corner. It contains the following elements:

- Number of Samples to Use:** Two radio buttons, "First" (selected) and "All".
- Tolerance:** A text input field containing the value "0".
- Message Fields:** Six text input fields, each with a vertical scroll bar on the right. The labels are:
 - Caution Low Message:
 - Caution High Message:
 - Warning Low Message:
 - Warning High Message:
 - Delta Message:
 - OK Message:
- Buttons:** Three buttons at the bottom: "OK", "Cancel", and "Help".

Figure 90 Add Set (Limit Monitor) Dialog

6.88 Modify Set (Limit Monitor) Dialog

The Modify Set dialog shown in Figure 91 is used to modify a set associated with a limit monitor. It can be accessed by pushing the Modify Set button on the Limit Monitor dialog. It will be populated with the data for the set that was selected in the Limit Monitor dialog.

Modify Set

Number of Samples to Use: ☐ First ☒ All

Tolerance:

Caution Low Message:

Caution High Message:

Warning Low Message:

Warning High Message:

Delta Message:

OK Message:

Figure 91 Modify Set (Limit Monitor) Dialog

6.89 New Expected State Monitor Dialog

The New Expected State Monitor dialog is shown in Figure 92. This dialog will appear when the New button is pushed for an Expected State monitor. If New has been selected, then this dialog will be empty for the most part. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to add a new set push the Add Set button. Then once you have added a set, you can modify the set by selecting the set number using the Set Number combo box and then pushing the Modify Set button. This will bring up a Modify Set dialog that can be used to modify the set data.

New Expected State Monitor

Name: Set Number:

Description:

Message Information

Number of Samples to Use: ☐ First ☐ All Tolerance:

Expected State Message:

OK Message:

Add Set... Modify Set... Delete Set

OK Modify Description... Cancel Help

Figure 92 New Expected State Monitor Dialog

Each field in the New Expected State Monitor dialog is described below.

Name

The name of the monitor.

Set Number

The set number field provides a way to select a particular set to view or modify.

Description

A description of the monitor. The Modify Description button provides access to a dialog that can be used to modify the description.

Message Information

The Message Information section contains information about each of the messages associated with one particular set.

Number of Samples to Use

The number of samples to use when performing the monitoring. First indicates that only the first sample will be used. All indicates that all samples will be used.

Tolerance

The Tolerance indicates the number of violations to allow before switching states.

Expected State Message

The message to generate for an out of expected state condition.

OK Message

The message to generate when conditions return to normal.

*Buttons*Add Set

When you push the Add Set button the Add Set dialog box described in section 6.91 will be displayed. This dialog provides a way to add a new expected state message set for the monitor.

Modify Set

When you push the Modify Set button the dialog box described in section 6.92 will be displayed. This dialog provides a way to modify an existing expected state message set for the monitor. It will be populated with the data corresponding to the set you selected in the Expected State Monitor dialog.

Delete Set

When you push Delete Set, the currently selected set will be deleted. You will be asked to confirm that you want to delete the set since the delete action cannot be reversed. You cannot delete the last set.

Modify Description

When you push the Modify Description button the Modify Description dialog box will be displayed. This dialog box is used to modify the monitor's description. It is described in section 6.50.

6.90 Modify Expected State Monitor Dialog

The Modify Expected State Monitor dialog box is shown in Figure 93. This dialog will appear when the Modify button is pushed for an Expected State monitor. If Modify has been selected, then the dialog will be populated with the monitor's properties. The fields in this dialog are all read-only. The Add Set, Modify Set, and Delete Set buttons are used to add a new set, modify an existing set, or delete an existing set respectively. For example, to modify a particular set, the set must be selected using the Set Number combo box and then the Modify Set button must be selected. This will bring up a Modify Set dialog that can be used to modify the set data. The Modify Expected State Monitor dialog works exactly like the New Expected State Monitor dialog which is described in section 6.89.

Modify Expected State Monitor

Name: MSID018 Set Number: 1

Description: Monitoring information for MSID018.

Message Information

Number of Samples to Use: ☐ First ☒ All Tolerance: 0

Expected State Message: MSID018 is not in its expected state of Initializing.

OK Message: MSID018 is back in its expected state.

Add Set... Modify Set... Delete Set

OK Modify Description... Cancel Help

Figure 93 Modify Expected State Monitor Dialog

6.91 Add Set (Expected Monitor) Dialog

The Add Set dialog shown in Figure 94 is used to add a set for an expected state monitor. It can be accessed by pushing the Add Set button on the Expected State Monitor dialog.

Add Set

Number of Samples to Use: ☒ First ☐ All Tolerance: 0

Expected State Message:

OK Message:

OK Cancel Help

Figure 94 Add Set (Expected State Monitor) Dialog

6.92 Modify Set (Expected State) Dialog

The Modify Set dialog shown in Figure 95 is used to modify a set associated with an expected state monitor. It can be accessed by pushing the Modify Set button on the Expected State Monitor dialog. It will be populated with the data for the set that was selected in the Expected State Monitor dialog box.

Figure 95 Modify Set (Expected State) Dialog

6.93 Monitoring Dialog

The Monitoring dialog is shown in Figure 96. This dialog shows a list of all the unique parameters that are currently being processed by your TReK system and have an associated monitor. It is used to control monitoring. Using this dialog you can turn monitoring on or off for any parameter listed.

Parameter	Packet Type	Data Mode	Monitor	Monitoring State	Data Arrives
MSID009	PDSS Payload	RealTime	MSID009	OFF	Unprocessed
MSID018	PDSS Payload	RealTime	MSID018	OFF	Unprocessed
MSID079	PDSS Payload	RealTime	MSID079	OFF	Unprocessed
MSID110	PDSS Payload	RealTime	MSID110	OFF	Unprocessed
MSID115	PDSS Payload	RealTime	MSID115	OFF	Unprocessed
M_CP_TYPE_1	PDSS Payload	RealTime	M_CP_TYPE_1	OFF	Unprocessed

Figure 96 Monitoring Dialog

Each column in the Monitoring dialog is described below:

Parameter

The parameter name.

Packet Type

The packet type associated with the parameter.

Data Mode

The data mode associated with the parameter.

Monitor

The monitor associated with the parameter. If there is a parameter that does not appear in the Monitoring dialog, it is either not being processed or a monitor has not been assigned to the parameter. To assign a monitor to a parameter use the Modify Parameter dialog which can be accessed from the Parameters dialog.

Monitoring State

Indicates whether monitoring is on or off.

Data Arrives

The Data Arrives column indicates whether the data arrives unprocessed, converted, or calibrated.

Buttons

Filter

The Filter button along with the Filter field and Filter By radio buttons provide a way to filter the list of parameters. The Filter By radio buttons are used to indicate which column to use for the filter. The Filter field is used to specify the filter criteria. If you leave the Filter field blank all parameters will be listed. If you put a * in the Filter field all parameters will be listed. The * character can be used to match one or more characters and the ? character can be used to match a single character. For example MSID1* means match all the parameters that begin with the characters MSID1. MSID1?1 means match all the parameters that begin with the characters MSID1, followed by a single character, followed by the character 1.

Note: When a filter has two or more * characters, only the first * character will be interpreted as zero or more characters. The 2nd, 3rd, etc. instances of * will be interpreted as a literal * character. Since the Parameter field does not support * as a valid character, your filter will return no items in the list if it has more than one * character.

You can enter more than one ? character in a filter and each of them will be interpreted as any single character. However, all ? characters after the first * character are interpreted as literal ? characters.

Start Monitoring

The Start Monitoring button is used to turn monitoring on for one or more parameters. This button is insensitive when there are no parameters selected. It is possible to select multiple parameters in the list.

Stop Monitoring

The Stop Monitoring button is used to turn monitoring off for one or more parameters. This button is insensitive when there are no parameters selected. It is possible to select multiple parameters in the list.

6.94 Monitoring Messages Dialog

The Monitoring Messages dialog is shown in Figure 97. This dialog shows all the monitoring messages generated when one or more parameters are being monitored. Messages in this dialog will never be deleted unless you push the Clear button. Therefore, if the dialog is closed you will not lose any messages. Similarly, if you receive one or more messages, and this dialog is not currently being displayed, the messages will be there the next time you select Monitoring Messages to display the dialog. You can clear the messages by pushing the Clear button. However, once the messages are cleared, there is no way to get them back.

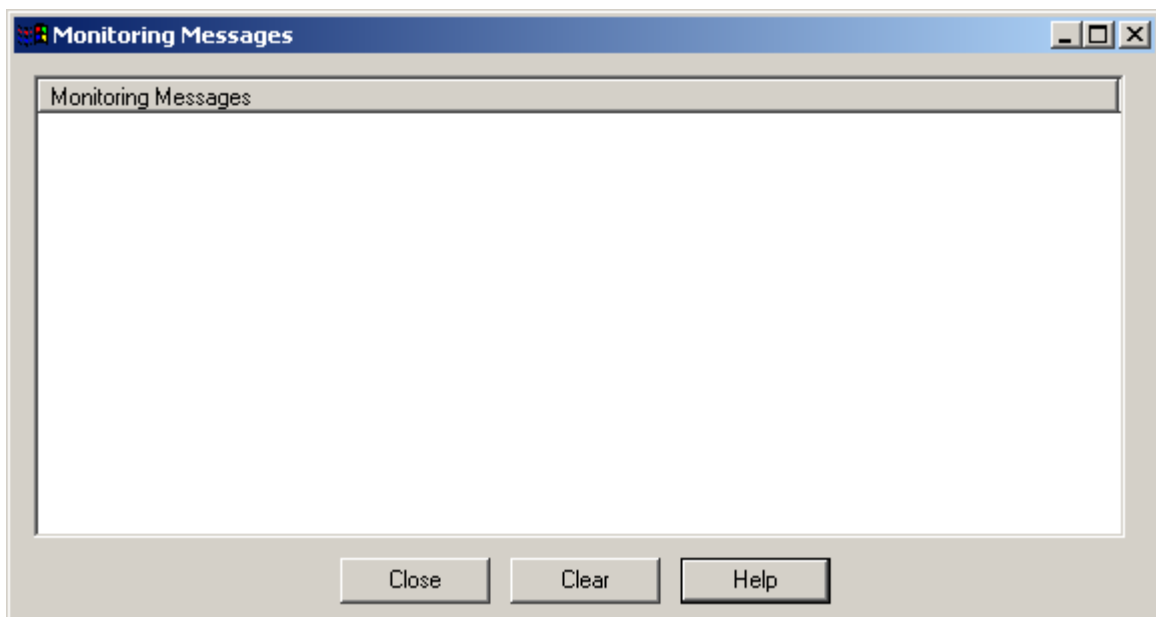


Figure 97 Monitoring Messages Dialog

6.95 Error Control for Preprocessed Parameters Dialog

The Error Control for Preprocessed Parameters dialog is shown in Figure 98. This dialog shows a list of all the unique error control objects currently in use or available for use.

Error control objects are used with preprocessed parameters such as GSE packet parameters. An error control object is assigned to a preprocessed parameter (using the Modify Parameter dialog). The error control object contains information that tells TReK how to handle errors associated with the preprocessed parameter. This situation can occur if the POIC encounters an error when performing the pre-processing for the parameter before it is placed in the GSE packet. For more detail about how TReK handles these errors please reference the TReK Telemetry Tutorial (TREK-USER-002).

You can sort the list of error control objects using Error Control Name or Description. To sort the list based on a particular column heading, use your mouse and left click on the column heading. When you click on a column heading you will see an up arrow or a down arrow. The arrow indicates whether the sort is ascending or descending.

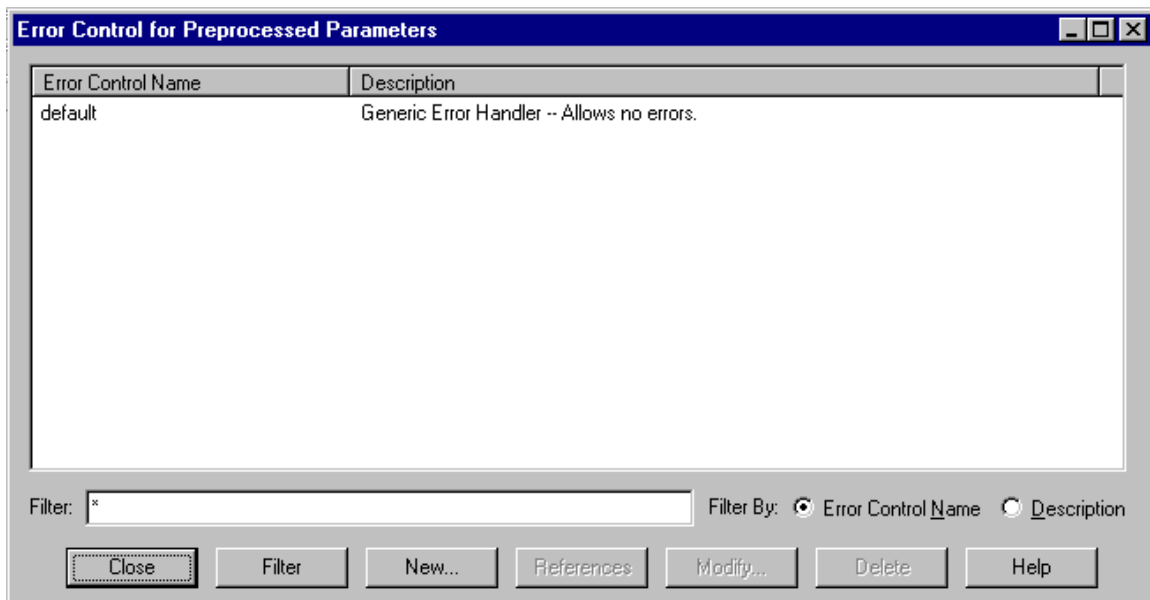


Figure 98 Error Control for Preprocessed Parameters Dialog

Each column in the Error Control for Preprocessed Parameters dialog is described below. The items in the list can be sorted based on column.

Error Control Name

The name of the error control object.

Description

A description of the error control object.

Dialog Buttons

There are several non-standard buttons on the Error Control for Preprocessed Parameters dialog box. Each is described below.

Filter

The Filter button along with the Filter field and Filter By radio buttons provide a way to filter the list of error control objects. The Filter By radio buttons are used to indicate which column to use for the filter. The Filter field is used to specify the filter criteria. If you leave the Filter field blank all error control objects will be listed. If you put a * in the Filter field all error control objects will be listed. The * character can be used to match one or more characters and the ? character can be used to match a single character. For example MY_ERROR* means match all the error control objects that begin with the characters MY_ERROR. MY_ERROR?1 means match all the error control objects that begin with the characters MY_ERROR, followed by a single character, followed by the character 1.

Note: When a filter has two or more * characters, only the first * character will be interpreted as zero or more characters. The 2nd, 3rd, etc. instances of * will be interpreted as a literal * character. Since the Error Control Name field does not support * as a valid character, your filter will return no items in the list if it has more than one * character. The * is a valid character for the Description field and more than one * can be used in a filter for the Description field.

You can enter more than one ? character in a filter and each of them will be interpreted as any single character. However, all ? characters after the first * character are interpreted as literal ? characters.

New

The New button provides a way to create a new error control object. Once defined this error control object will be added to the list of available error control objects. Once it is available it can be assigned to one or more measurements. If you save your configuration, any new error control objects that were defined using this “New” capability will be saved with the configuration.

References

The References button provides access to the References dialog box. The References dialog box provides a way to see the list of parameters that are using the error control object. This is helpful in case you have forgotten which parameters are using the error control object. The References dialog is described in section 6.45. The References button will only be available when an item in the list is selected.

Modify

The Modify button provides access to a dialog box that can be used to view or modify properties associated with the error control object. The Modify button will only be available when an item in the list is selected.

Delete

The Delete button provides a way to delete an error control object. An error control object can only be deleted if it has no references. Therefore, it is not possible to delete an error control object that is in use. The Delete button will only be available when an item in the list is selected.

6.96 New Error Control Dialog

The New Error Control dialog is shown in Figure 99. This dialog is used to create a new error control object.

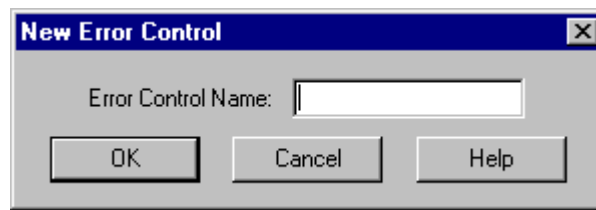


Figure 99 New Error Control Dialog

Each field in the New Error Control dialog box is described below:

Error Control Name

The name to use for the new error control object.

6.97 New Error Control for Preprocessed Parameter Dialog

The New Error Control for Preprocessed Parameter dialog is shown in Figure 100. This dialog will appear when the New button is pushed for an Error Control object. If New has been selected, then this dialog will initialize with all the errors set to Disallow. The Disallow All Errors radio button provides a way to specify that all errors should be disallowed. The Allow All Errors button provides a way to specify that all errors should be allowed. The Specify radio button provides a way to specify how each individual error should be handled. When you push the Specify radio button the list of errors will become sensitive. Once the list is sensitive you can select one or more errors in the list and then use the Allow or Disallow button to indicate how the error(s) should be handled.

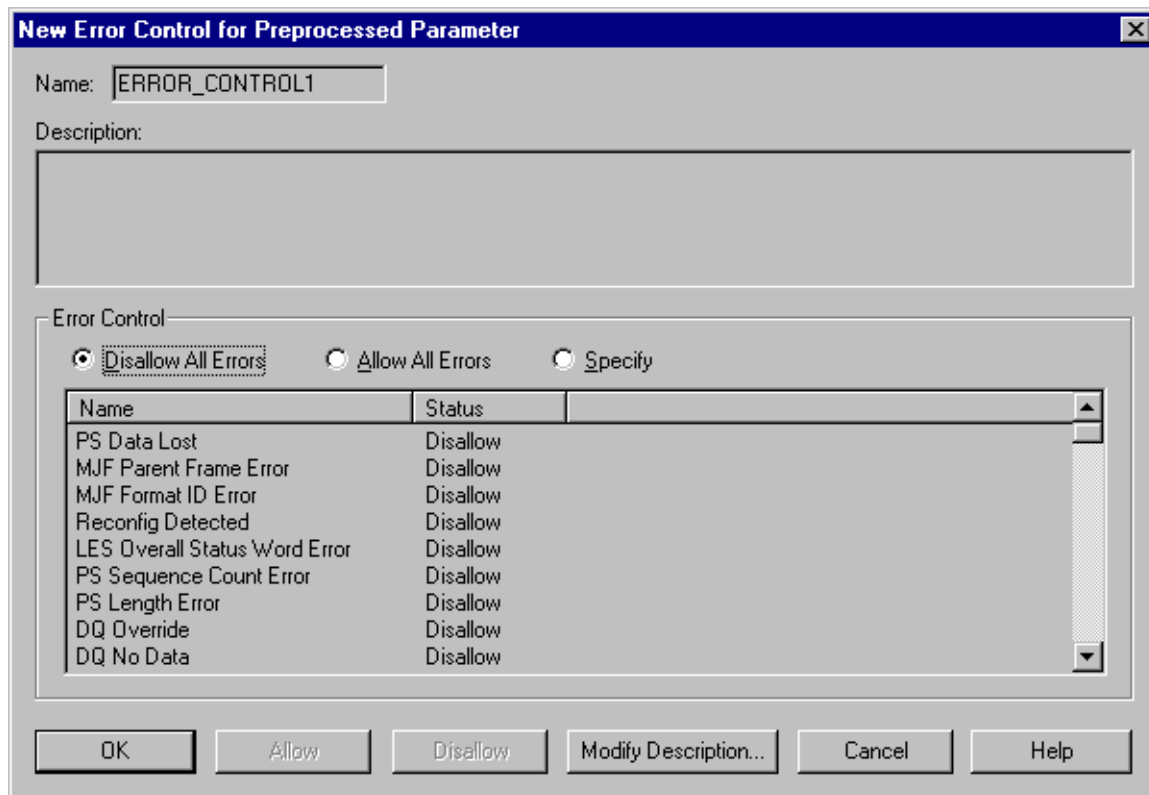


Figure 100 New Error Control for Preprocessed Parameter Dialog

Each field in the New Error Control for Preprocessed Parameter dialog is described below.

Name

The name of the error control object.

Description

A description of the error control object. The Modify Description button provides access to a dialog that can be used to modify the description.

Radio Buttons

Disallow All Errors

The Disallow All Errors button is used to indicate that all errors should be disallowed.

Allow All Errors

The Allow All Errors button is used to indicate that all errors should be allowed.

Specify

The Specify radio button provides a way to specify how each individual error should be handled. When you push the Specify button, the list of errors will become sensitive. Once the list is sensitive you can select one or more errors in the list and then use the Allow or Disallow push buttons at the bottom of the dialog to indicate how the error(s) should be handled.

*Buttons*Allow

The Allow button is used to set the Allow property for one or more errors. This button is insensitive when there are no errors selected. It is possible to select multiple errors in the list.

Disallow

The Disallow button is used to set the Disallow property for one or more errors. This button is insensitive when there are no errors selected. It is possible to select multiple errors in the list.

Modify Description

When you push the Modify Description button the Modify Description dialog box will be displayed. This dialog box is used to modify the error control object's description. It is described in section 6.50.

6.98 Modify Error Control for Preprocessed Parameter Dialog

The Modify Error Control for Preprocessed Parameter dialog is shown in Figure 101. This dialog will appear when the Modify button is pushed for an Error Control object. If Modify has been selected, then the dialog will be populated with the error control's properties. The Modify Error Control for Preprocessed Parameter dialog works exactly like the New Error Control for Preprocessed Parameter dialog which is described in section 6.97.

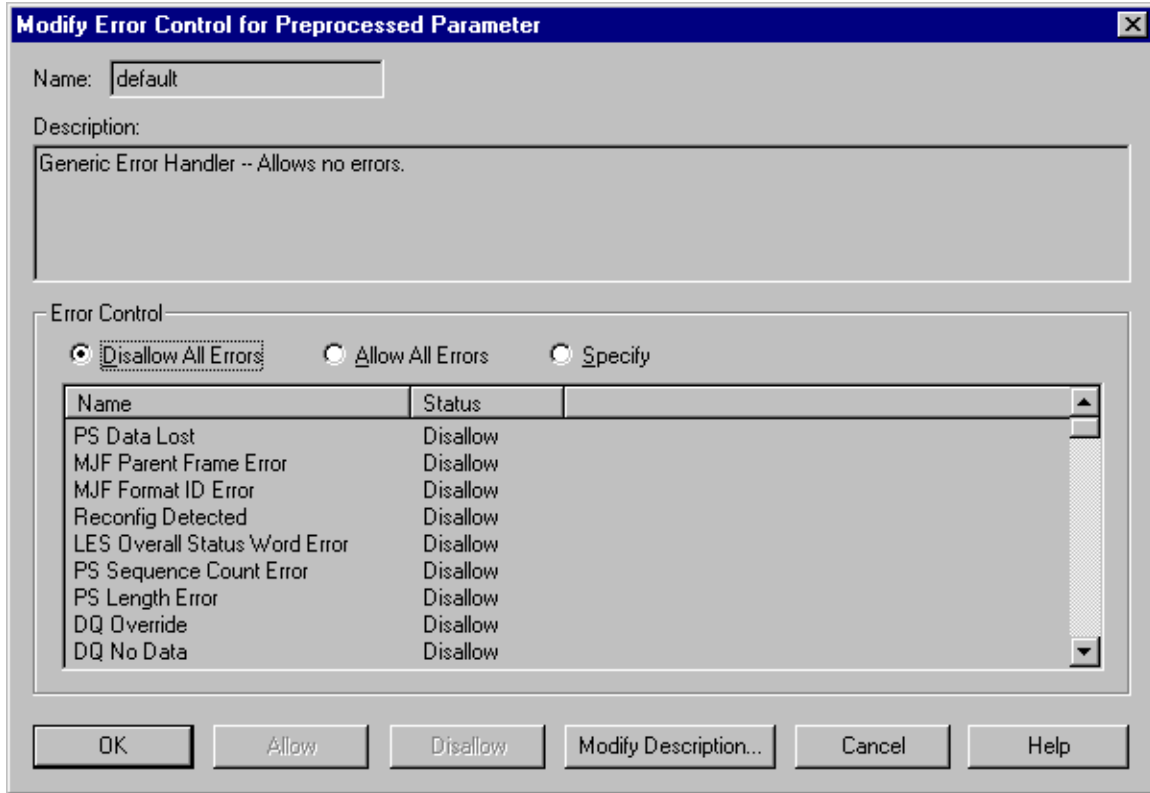


Figure 101 Modify Error Control for Preprocessed Parameter Dialog

6.99 Validation Messages Dialog

The Validation Messages dialog shown in Figure 102 is displayed when an error occurs as the result of entering invalid data into a processing element dialog such as an Add Set dialog or a Modify Set dialog. The errors listed in this dialog will provide as much information as possible to help you find and correct the error. You must correct all errors before you can proceed. For a complete list of the errors that can appear in this dialog please see the Validation Messages section in on-line help.

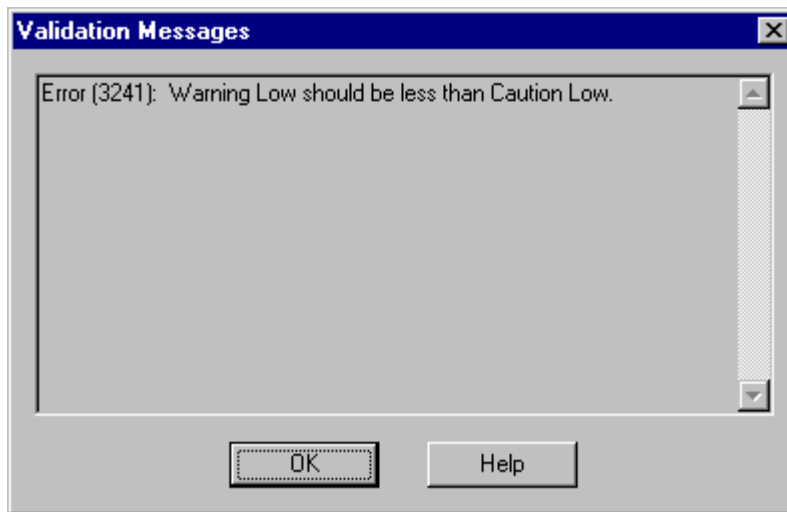


Figure 102 Validation Messages Dialog

The dialog shown in Figure 103 will be displayed if there are only warning messages and no errors. Since warning messages can be ignored, you are given the option of pushing Yes to proceed with the changes or No to stay on the dialog and modify the changes.

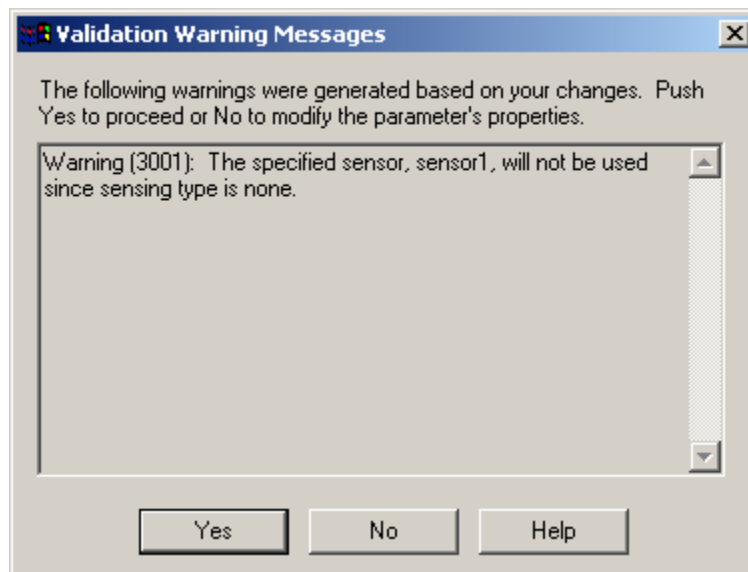


Figure 103 Validation Warning Messages Dialog

6.100 Displays Dialog

The Displays dialog is shown in Figure 104. It can be used to Add, Modify, Delete, or Run a display.

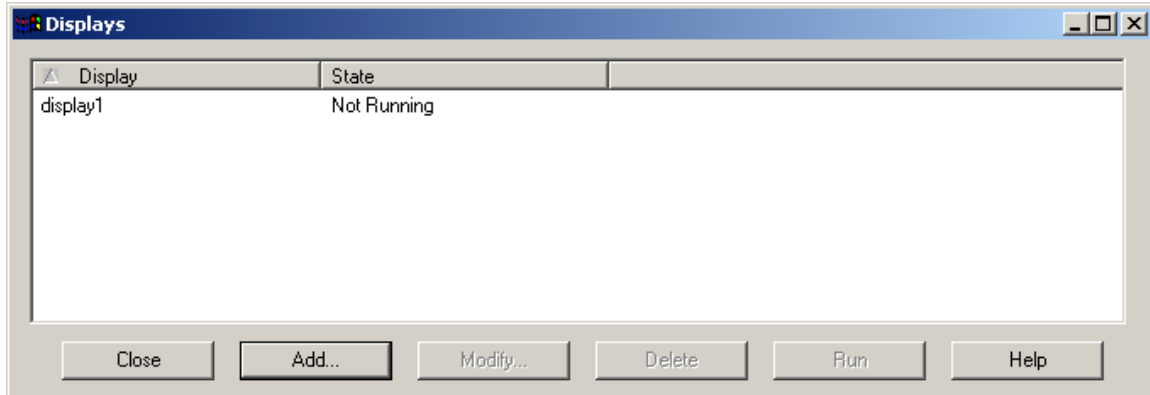


Figure 104 Displays Dialog

Display List

The Display List contains two columns. The Display column shows the name of the display. The State column identifies the current state of the display: Not Running, Running, or Modify In Progress.

Dialog Buttons

There are four non-standard buttons on the Displays dialog. They are described below.

Add

The Add button displays the Add Display dialog which is used to create a new display.

Modify

The Modify button displays a Modify Display dialog for the selected display.

Delete

The Delete button deletes the selected display.

Run

The Run button runs the selected display.

6.101 Add Display Dialog

The Add Display dialog is shown in Figure 105 below. It is used to create a new display.

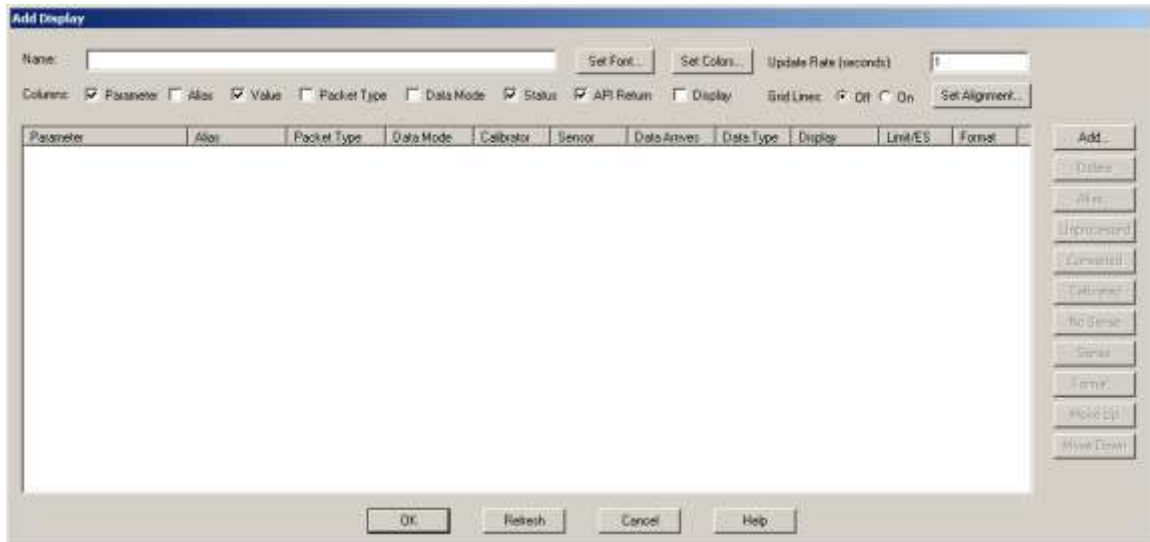


Figure 105 Add Display Dialog

Each field and control on the Add Display dialog is described below.

Name

The name of the display. Names are case sensitive.

Set Font

The Set Font button is used to access the Set Font dialog. This dialog can be used to assign a specific font for the text that appears on the display. This is the standard windows font dialog.

Set Colors

The Set Colors button is used to access the Set Colors dialog. This dialog can be used to assign specific display colors (such as the background color, text color, etc.).

Update Rate

The update rate for the display.

Columns

There are eight checkboxes that represent the columns that can appear on the display. At least one checkbox must be checked. The meaning of each column is described below:

Column Name	Meaning
Parameter	The parameter's name.
Alias	The alias provides a way to use a name other than the parameter name. The alias will default to the parameter's technical name.
Value	The parameter's value.

Packet Type	The packet type for the packet which contains the parameter.
Data Mode	The data mode for the packet which contains the parameter.
Status	The status string associated with the value.
API Return	<p>The API Return column is used to display information related to the retrieval of the parameter's value. If the API Return is "Success", then the data was successfully retrieved. If the API Return is "Fail", then an error occurred while trying to retrieve the data. If the API Return is "No Data Available", it means TReK has not yet received this data. If the API Return is "Parameter Not Found", this means that TReK is not currently configured to process this parameter.</p> <p>Note: The API Return information is directly related to the TReK Telemetry Application Programming Interface library. The Telemetry Processing application uses this library to retrieve the data to be displayed. It is not necessary for you to be familiar with the Telemetry Application Programming Interface library to use the display capability. However, if you would like to learn more about the Telemetry Application Programming Interface library, please see the TReK Telemetry Application Programming Interface Reference Manual (TREK-USER-027).</p>
Display	The Display field identifies what type of value will be displayed (Unprocessed, Converted, or Calibrated). If the parameter has an assigned calibrator, then the display type will default to "Calibrated". If the parameter does not have a calibrator, but can be converted, then the display type will default to "Converted". If the parameter cannot be converted (such as a parameter with data type IUND) then the display type will default to Unprocessed. If you would like to change the type of value to be displayed, just select the parameter and push the Unprocessed, Converted, or Calibrated button on the right hand side of the list. The rules noted above always apply. So if you try to display a calibrated value for a parameter that has no assigned calibrator you will get an error message.

Parameter List

The parameter list defines what parameters should be shown on the display. The Add button is used to add parameters to the list, and the delete button is used to delete parameters from the list. Each column in the parameter list is described below:

Column	Meaning
Parameter	The parameter's name.
Alias	The alias provides a way to use a name other than the parameter name. The alias will default to the parameter's technical name.
Value	The parameter's value.
Packet Type	The packet type for the packet which contains the parameter.
Data Mode	The data mode for the packet which contains the parameter.

Calibrator	The calibrator associated with the parameter. This column will be blank if no calibrator has been assigned to the parameter. This value will be “Unknown” if the parameter is not currently being processed by TReK.
Sensor	The sensor associated with the parameter. This column will be blank if no sensor has been assigned to the parameter. This value will be “Unknown” if the parameter is not currently being processed by TReK.
Data Arrives	The Data Arrives column indicates whether the data arrives unprocessed, converted, or calibrated.
Data Type	The parameter’s data type.
Display	The Display field identifies what type of value will be displayed (Unprocessed, Converted, or Calibrated). If the parameter has an assigned calibrator, then the display type will default to “Calibrated”. If the parameter does not have a calibrator, but can be converted, then the display type will default to “Converted”. If the parameter cannot be converted (such as a parameter with data type IUND) then the display type will default to Unprocessed. If you would like to change the type of value to be displayed, just select the parameter and push the Unprocessed, Converted, or Calibrated button on the right hand side of the list. The rules noted above always apply. So if you try to display a calibrated value for a parameter that has no assigned calibrator you will get an error message.
Limit/ES	The Limit/ES setting is similar to the Display setting. If a sensor has been assigned, then the parameter will default to “Sense”. However, if no sensor is available, then the Limit/ES setting will default to “No Sense”.
Format	The Format field provides a way to set the number of places after the decimal point for values that will be displayed as real numbers. This applies to all parameters that have a floating point data type (such as FEEE) and will be displayed as a converted or calibrated value. It also applies to parameters that have either an integer or floating point data type (except IDIS) and will be displayed as a calibrated value. If a parameter’s value will be displayed as a real number, then the Format field can be modified, otherwise it will be set to N/A and cannot be modified.

The order of the parameters in the list determines the order of the parameters on the display. You can select one or more parameters and then use the Move Up and Move Down buttons on the right hand side of the list to adjust the order of the parameters in the list. When you add parameters to the list, they are always added to the bottom of the list. Therefore, if you have arranged the list, and you add more parameters, the existing order will not be disturbed.

Grid Lines

Grid Lines (vertical and horizontal) can be turned on or off.

Set Alignment

The Set Alignment button is used to access the Set Alignment dialog. This dialog can be used to specify the alignment for each column (Left, Center, Right). All columns are listed on this dialog even though there may be some columns that do not appear on the display (based on your column selections).

Buttons That Modify the Data in the Parameter List

Add

The Add button displays the Add (Parameter) dialog. This dialog is used to select one or more parameters to add to the parameter list.

Delete

The Delete button is used to delete one or more parameters from the list.

Alias

The Alias button is used to modify the Alias associated with a parameter. You can only modify the alias for one parameter at a time.

Unprocessed

The Unprocessed button is used to specify that the parameter's unprocessed value should be displayed. When you select one or more parameters and push the Unprocessed button, you will see the Display column change to Unprocessed for the selected parameters.

Converted

The Converted button is used to specify that the parameter's converted value should be displayed. When you select one or more parameters and push the Converted button, you will see the Display column change to Converted for the selected parameters. You can only display a converted value for parameters that have a converter. If you try to apply this to one or more parameter's that do not have a converter, you will get an error message.

Calibrated

The Calibrated button is used to specify that the parameter's calibrated value should be displayed. When you select one or more parameters and push the Calibrated button, you will see the Display column change to Calibrated for the selected parameters. You can only display a calibrated value for parameters that have a calibrator. If you try to apply this to one or more parameter's that do not have a calibrator, you will get an error message.

No Sense

The No Sense button is used to specify that the parameter's value should not be sensed. When you select one or more parameters and push the No Sense button, you will see the Limit/ES column change to No Sense for the selected parameters.

Sense

The Sense button is used to specify that the parameter's value should be sensed. When you select one or more parameters and push the Sense button, you will see the Limit/ES column change to Sense for the selected parameters. You can only perform sensing on parameters that have a sensor. If you try to apply this to one or more parameter's that do not have a sensor, you will get an error message.

Format

The Format button provides access to the Format dialog. This dialog can be used to set the number of places after the decimal for a value that will be displayed as a real number. This applies to all parameters that have a floating point data type (such as FEEE) and will be displayed as a converted or calibrated value. It also applies to parameters that have either an integer or floating point data type (except IDIS) and will be displayed as a calibrated value. If a parameter's value will be displayed as a real number, then the Format field can be modified, otherwise it will be set to N/A and cannot be modified.

Move Up

The Move Up button is used to move one parameter up in the list by one position.

Move Down

The Move Down button is used to move one parameter down in the list by one position.

Dialog Buttons

There is one non-standard button on the Add Display dialog. It is described below.

Refresh

Since the Parameters dialog is a modeless dialog, it is possible to modify a parameter's properties using the Modify Parameter dialog after you have already brought up the Add Display dialog. In this scenario, if you change the parameter's calibrator or sensor properties, these changes will not be reflected automatically in the Add Display dialog's parameter list. In order to see these changes in the parameter list, you must push the Refresh button.

6.102 Add (Parameter) Dialog

The Add (Parameter) dialog is shown in Figure 106. This dialog shows a list of all the unique parameters currently being processed by your TReK system. It is used to add parameters to a display.

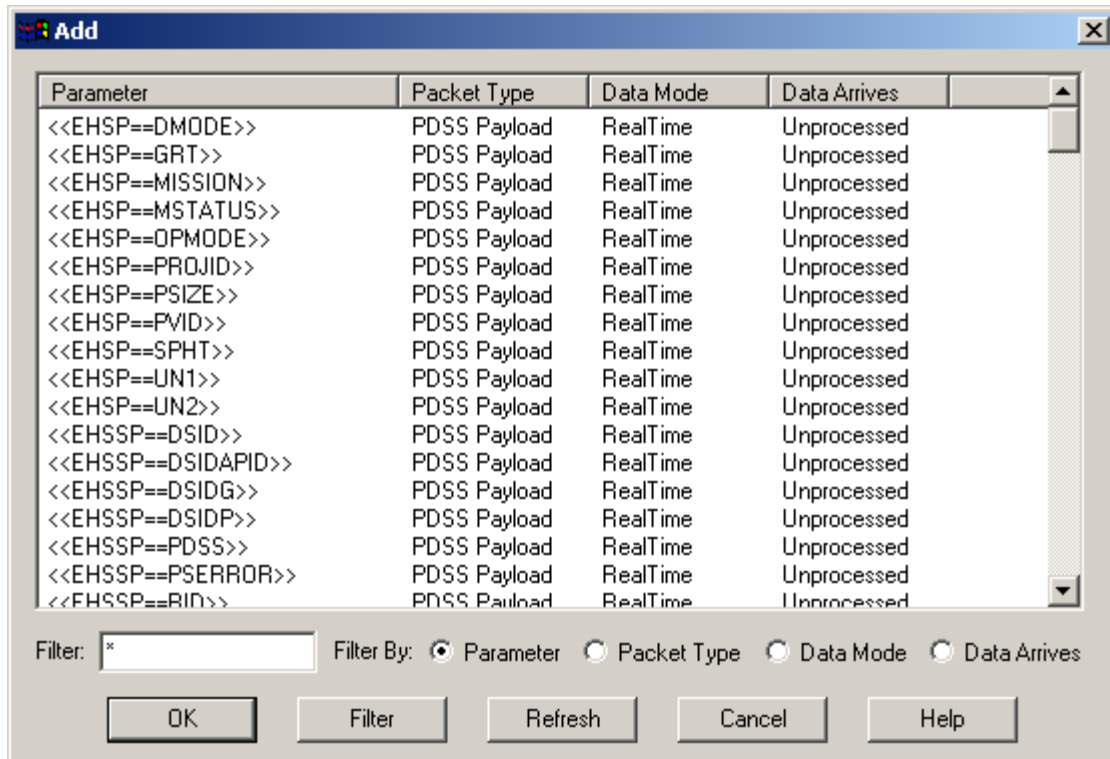


Figure 106 Add (Parameter) Dialog

When there are no packets in the main window packet list, or there are one or more packets but none of the packets have been activated, this dialog will be empty (there will be no parameters in the list). This is because when the list is empty or no packets have been activated there are no packets being processed, and therefore there are no parameters being processed. However, once a packet has been added to the packet list and activated (and the processing type for the packet is Process Entire Packet, Process Selected Parameters, Process On Request Hybrid, or Process On Request Only), then the parameters associated with the packet and the specific processing type will be listed in the Add Parameter dialog.

Each column in the Add (Parameter) dialog is described below:

Parameter

The parameter name.

Packet Type

The packet type for the packet which contains the parameter.

Data Mode

The data mode for the packet which contains the parameter.

Data Arrives

The Data Arrives column indicates whether the data arrives unprocessed, converted, or calibrated.

Dialog Buttons

There are two non-standard buttons on the Add Parameter dialog. They are described below.

Filter

The Filter button along with the Filter field and Filter By radio buttons provide a way to filter the list of parameters. The Filter By radio buttons are used to indicate which column to use for the filter. The Filter field is used to specify the filter criteria. If you leave the Filter field blank all parameters will be listed. If you put a * in the Filter field all parameters will be listed. The * character can be used to match one or more characters and the ? character can be used to match a single character. For example MSID1* means match all the parameters that begin with the characters MSID1. MSID1?1 means match all the parameters that begin with the characters MSID1, followed by a single character, followed by the character 1.

Note: When a filter has two or more * characters, only the first * character will be interpreted as zero or more characters. The 2nd, 3rd, etc., instances of * will be interpreted as a literal * character. Since the Parameter field does not support * as a valid character, your filter will return no items in the list if it has more than one * character.

You can enter more than one ? character in a filter and each of them will be interpreted as any single character. However, all ? characters after the first * character are interpreted as literal ? characters.

Refresh

In some cases, you may access the Add (Parameter) dialog while there are one or more packets in the main window packet list that are initializing. In this scenario, if the packet finishes activating after you have displayed the Add (Parameter) dialog, the parameters associated with the packet will not be added to the list automatically. In order to see the parameters you must push the Refresh button. This is also true if a packet is in the process of being deleted. The parameters will not be deleted from the list automatically. You must push the Refresh button to see that the parameters are no longer available.

6.103 Set Font Dialog

The Set Font dialog is the standard windows font dialog. Please reference Microsoft documentation for information about the Font dialog.

6.104 Set (Display) Colors Dialog

The Set Colors dialog is shown in Figure 107. This dialog is used to specify colors for a display.

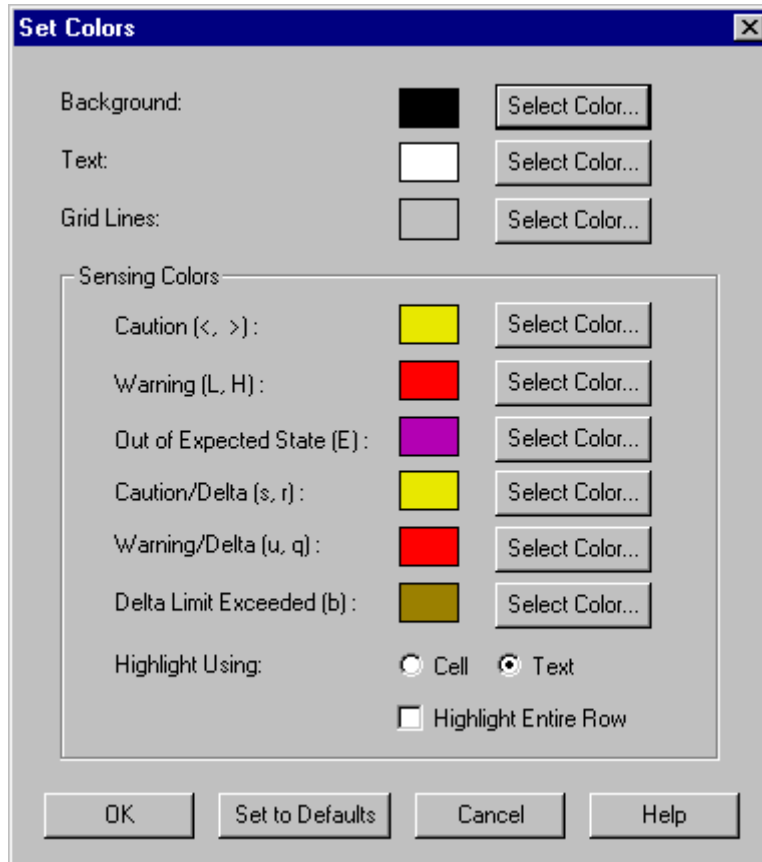


Figure 107 Set (Display) Colors Dialog

Each field and control on the Set Colors dialog is described below.

Background

Sets the background color for the display. (Default Color: Black)

Text

Sets the color of the display text. (Default Color: White)

Grid Lines

Sets the color of the grid lines used in the display. (Default Color: Gray)

Caution

The color assigned when the parameter's sensing condition is Caution Low or Caution High. (Default Color: Yellow)

Warning

The color assigned when the parameter's sensing condition is Warning Low or Warning High. (Default Color: Red)

Out of Expected State

The color assigned when the parameter's sensing condition is Out of Expected State. (Default Color: Purple)

Caution/Delta

The color assigned when the parameter's sensing condition is Caution Low and Delta Error or Caution High and Delta Error. (Default Color: Yellow)

Warning/Delta

The color assigned when the parameter's sensing condition is Warning Low and Delta Error or Warning High and Delta Error. (Default Color: Red)

Delta Limit Exceeded

The color assigned when the parameter's sensing condition is Delta Limit Exceeded. (Default Color: Gold)

Highlight Using Cell Radio Button

Indicates that the background color of the value cell should be changed to the assigned color based on the parameter's current sensing condition.

Highlight Using Text Radio Button

Indicates that the color of the value text should be changed to the assigned color based on the parameter's current sensing condition.

Highlight Entire Row Checkbox

Indicates that the entire row should be changed to the assigned color (either the text or the background based on the Cell/Text radio button selection).

*Buttons*Select Color

The Select Color button is used to access the standard Windows Color dialog in order to change the assigned color.

Set to Defaults

The Set to Defaults button will reset all the fields and controls in the dialog to the original values that were in place when the TReK software was installed.

6.105 Set (Display) Alignment Dialog

The Set Alignment dialog is shown in Figure 108. This dialog is used to set the text alignment for each column that can be displayed on a display.

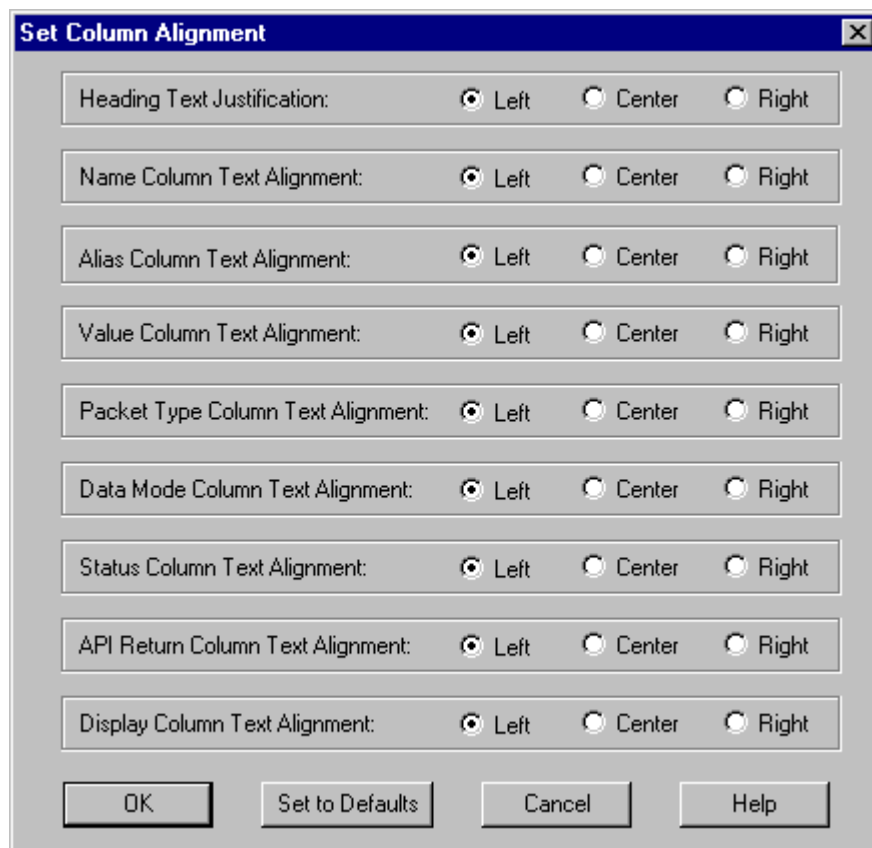


Figure 108 Set Alignment Dialog

The Left, Center, and Right radio buttons specify how the column text should be justified. Each column on the dialog is listed even though some of the columns may not be displayed on the display.

Buttons

Set to Defaults

The Set to Defaults button will reset all the fields and controls in the dialog to the original values that were in place when the TReK software was installed.

6.106 Alias Dialog

The Alias dialog is shown in Figure 109. This dialog is used to modify the alias associated with a parameter that will be displayed on a display.

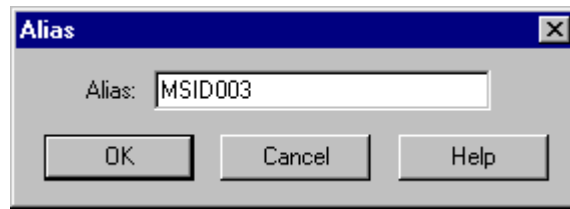


Figure 109 Alias Dialog

6.107 Set Numeric Format Dialog

The Set Numeric Format dialog is shown in Figure 110. This dialog is used to modify the format associated with a parameter value that will be displayed as a real number on a display. The Number of Places After Decimal value identifies how many digits should appear after the decimal point.

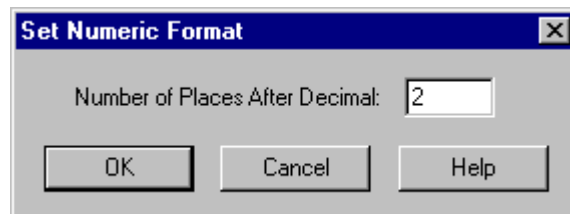


Figure 110 Set Numeric Format Dialog

6.108 Modify Display Dialog

The Modify Display dialog is identical to the Add Display dialog with regard to functionality. The main difference is that you cannot modify the display's name when you are modifying a display. Please see the Add Display dialog box section for details about the functionality provided by the Modify Display dialog.

6.109 Recording (Parameters) Dialog

The Recording (Parameters) dialog is shown in Figure 111. It can be used to create a parameter recording session, modify a parameter recording session, delete a parameter recording session, start a parameter recording session, or stop a parameter recording session.

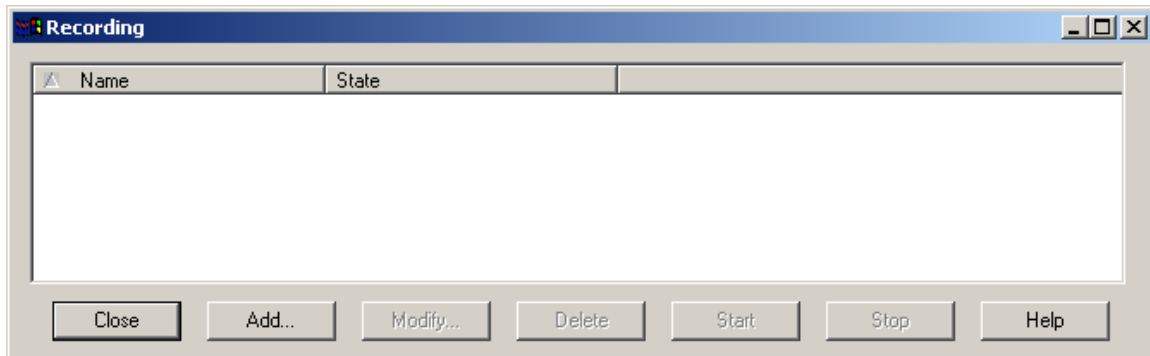


Figure 111 Recording (Parameters) Dialog

Parameter Recording Sessions List

The Parameter Recording Sessions List contains two columns. The Name column shows the name of the Parameter Recording Session. The State column identifies the current state of the Parameter Recording Session: Not Recording, Recording, or Modify In Progress.

Dialog Buttons

There are several non-standard buttons on the Recording (Parameters) dialog. They are described below.

Add

The Add button displays the Add Parameter Recording Session dialog. This dialog can be used to create and add a parameter recording session.

Modify

The Modify button displays the Modify Parameter Recording Session dialog. This dialog can be used to modify a parameter recording session.

Delete

The Delete button deletes the selected Parameter Recording Session.

Start

The Start button starts the selected Parameter Recording Session.

Stop

The Stop button stops the selected Parameter Recording Session.

Note: When you open a Telemetry Processing configuration file, be sure to activate all packets containing parameters to be recorded before you start parameter recording. If none of the packets containing the parameters are activated before you start recording, the data will not be recorded. Even if you activate the packet after starting parameter recording, the data will not be recorded. If you run into this scenario (where parameter recording was started before the packet was activated), just stop parameter recording and then start it again and that should take care of the problem.

6.110 Add Parameter Recording Session Dialog

The Add Parameter Recording Session dialog is shown in Figure 112 below. It is used to create a new Parameter Recording Session.

Figure 112 Add Parameter Recording Session Dialog

Each field and control on the Add Parameter Recording Session dialog is described below.

Name

The name of the Parameter Recording Session. Names are case sensitive.

Recording Properties

There are three ways to control the frequency with which data is recorded: Record Every Packet, Record On Interval, and Record Only On Change. Each is described below.

Frequency	How it Works
Record Every Packet	If you select Record Every Packet, values are recorded from every packet that arrives.
Record On Interval	If you select Record On Interval, values will only be recorded on that time interval.
Record Only On Change	If you select Record Only On Change, the converted and calibrated values will only be recorded when they change. Unprocessed values will always be recorded.

Recording File Properties

There are several pieces of information you must provide about where to store the recorded data. Each is described below.

Base Filename (Required Field)

When your TReK system records the parameter, the information is stored in an ASCII file in a local directory. A base filename (provided by you) is used as the base name of the file and the rest of the file name is generated by your TReK system. The complete filename indicates the time the file was created and closed. The ASCII file can be used with Microsoft Excel, or other products capable of importing delimited data, to view the data in a tabular or graphical format.

Directory (Required Field)

The Directory information is used to tell your TReK system which directory should be used when storing your parameter recording file. This field requires a complete directory path. An example of this is `c:\MyRecordingFiles\`. If you don't like to type or you need help defining the complete path, you can push the ... (dot dot dot) button located to the right of the Directory field. This will bring up a Windows Browse for Folder dialog which you can use to identify the local directory path where you want to store your recorded data files. The Browse for Folder dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help.

Maximum File Size (bytes) (Required Field)

The Maximum File Size information is used to determine when to close the parameter recording file. This property is always used.

Maximum Time File Is Open (minutes) The Maximum Time File Is Open Checkbox is used to indicate whether the file should be closed based on a maximum time. This is an optional property. If you check the checkbox then this property will be used. If you check the box, then you must also fill in the text field with the amount of time in minutes that should be used as the maximum time. The Maximum Time File Is Open property is used in addition to the Maximum File Size property. If the maximum size is reached before the maximum time, then the file will be closed based on the size. However, if the maximum time is reached before the maximum size is reached, the file will be closed based on the maximum time.

Columns

There are six checkboxes that represent the columns that can appear in the data that is recorded. The meaning of each column is described below:

Column Name	Meaning
APID	The APID that contains the parameter.
Parameter	The parameter's name.
Alias	The alias provides a way to use a name other than the Parameter Name. The alias will default to the parameter's technical name.
Packet Type	The packet type for the packet which contains the parameter.
Data Mode	The data mode for the packet which contains the parameter.
Type of Value	The type of value (unprocessed, converted, or calibrated).

Delimiter

The character used to separate the values of columns as they are written to the recording file.

Note: Using a space or colon as a delimiter can render the file useless if you are recording a parameter (e.g. time) that contains the delimiter character.

Parameter List

The parameter list defines what parameters should be recorded. The Add button is used to add parameters to the list, and the delete button is used to delete parameters from the list. Each column in the parameter list is described below:

Column	Meaning
APID	The APID that contains the parameter.
Parameter	The parameter's name.
Alias	The alias provides a way to use a name other than the Parameter Name. The alias will default to the parameter's technical name.
Packet Type	The packet type for the packet which contains the parameter.
Data Mode	The data mode for the packet which contains the parameter.
Calibrator	The calibrator associated with the parameter. This column will be blank if no calibrator has been assigned to the parameter. This value will be "Unknown" if the parameter is not currently being processed by TReK.
Data Arrives	The Data Arrives column indicates whether the data arrives unprocessed, converted, or calibrated.
Data Type	The parameter's data type.

Type of Value	The Type of Value field identifies what type of value will be recorded (Unprocessed, Converted, or Calibrated). If the parameter has an assigned calibrator, then the type of value will default to “Calibrated”. If the parameter does not have a calibrator, but can be converted, then the type of value will default to “Converted”. If the parameter cannot be converted (such as a parameter with data type IUND) then the type of value will default to Unprocessed. If you would like to change the type of value to be recorded, just select the parameter and push the Unprocessed, Converted, or Calibrated button on the right hand side of the list. The rules noted above always apply. So if you try to record a calibrated value for a parameter that has no assigned calibrator you will get an error message.
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The order of the parameters in the list determines the order of the parameters in the file. You can select one or more parameters and then use the Move Up and Move Down buttons on the right hand side of the list to adjust the order of the parameters in the list. When you add parameters to the list, they are always added to the bottom of the list. Therefore, if you have arranged the list, and you add more parameters, the existing order will not be disturbed.

Buttons That Modify the Data in the Parameter List

Add

The Add button displays the Add (Parameter) dialog. This dialog is used to select one or more parameters to add to the parameters list.

Delete

The Delete button is used to delete one or more parameters from the list.

Alias

The Alias button is used to modify the Alias associated with a parameter. You can only modify the alias for one parameter at a time.

Unprocessed

The Unprocessed button is used to specify that the parameter’s unprocessed value should be recorded. When you select one or more parameters and push the Unprocessed button, you will see the Type of Value column change to Unprocessed for the selected parameters.

Converted

The Converted button is used to specify that the parameter’s converted value should be recorded. When you select one or more parameters and push the Converted button, you will see the Type of Value column change to Converted for the selected parameters. You can only record a converted value for parameters that have a converter. If you try to

apply this to one or more parameter's that do not have a converter, you will get an error message.

Calibrated

The Calibrated button is used to specify that the parameter's calibrated value should be recorded. When you select one or more parameters and push the Calibrated button, you will see the Type of Value column change to Calibrated for the selected parameters. You can only record a calibrated value for parameters that have a calibrator. If you try to apply this to one or more parameter's that do not have a calibrator, you will get an error message.

Move Up

The Move Up button is used to move one parameter up in the list by one position.

Move Down

The Move Down button is used to move one parameter down in the list by one position.

Dialog Buttons

There is one non-standard button on the Add Parameter Recording Session dialog. It is described below.

Refresh

Since the Parameters dialog is a modeless dialog, it is possible to modify a parameter's properties using the Modify Parameter dialog after you have already brought up the Add Parameter Recording Session dialog. In this scenario, if you change the parameter's calibrator properties, these changes will not be reflected automatically in the Add Parameter Recording Session dialog's parameter list. In order to see these changes in the parameter list, you must push the Refresh button.

6.111 Add (Parameter) Dialog

The Add (Parameter) dialog is shown in Figure 113. This dialog shows a list of all the unique parameters currently being processed by your TReK system. It is used to add parameters to a Parameter Recording Session. (Note: This dialog is identical to the dialog described in section 6.102, except for the additional APID column).

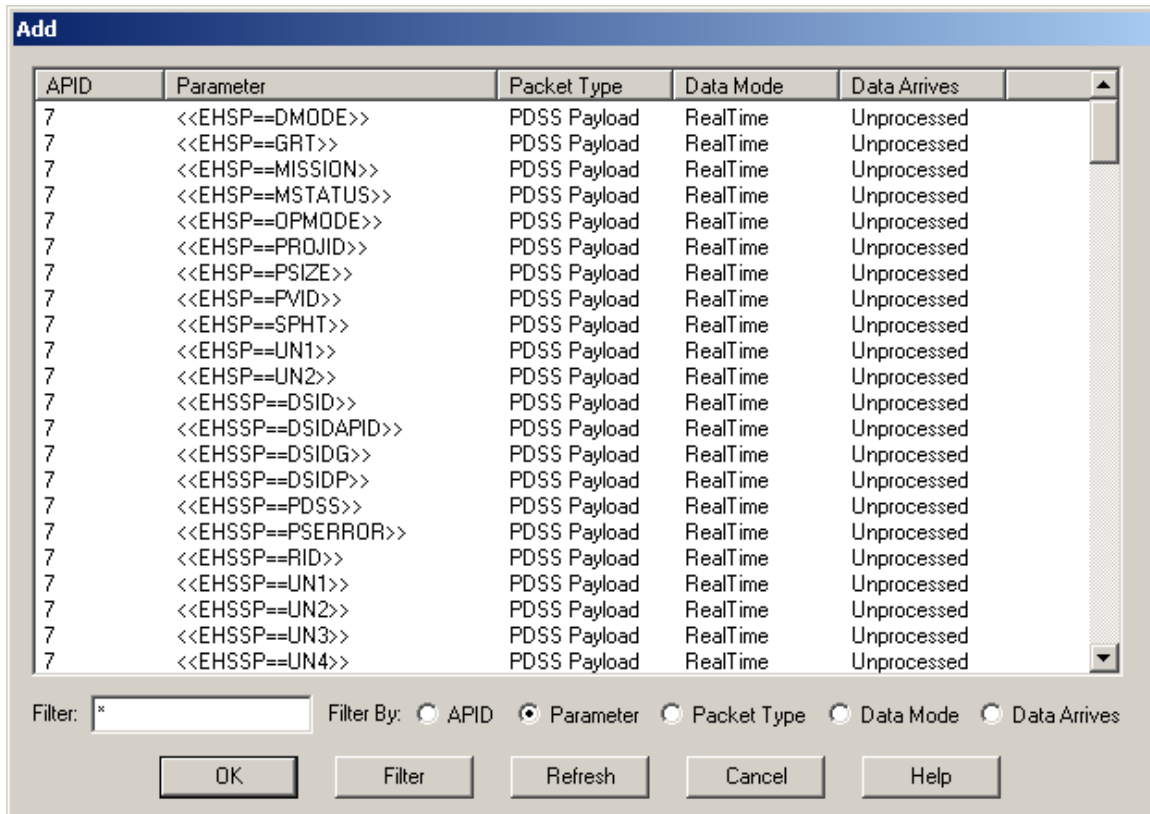


Figure 113 Add (Parameter) Dialog

When there are no packets in the main window packet list, or there are one or more packets but none of the packets have been activated, this dialog will be empty (there will be no parameters in the list). This is because when the list is empty or no packets have been activated there are no packets being processed, and therefore there are no parameters being processed. However, once a packet has been added to the packet list and activated (and the processing type for the packet is Process Entire Packet, Process Selected Parameters, Process On Request Hybrid, or Process On Request Only), then the parameters associated with the packet and the specific processing type will be listed in the Add Parameter dialog.

Each column in the Add (Parameter) dialog is described below:

APID

The APID that contains the parameter.

Parameter

The parameter name.

Packet Type

The packet type for the packet which contains the parameter.

Data Mode

The data mode for the packet which contains the parameter.

Data Arrives

The Data Arrives column indicates whether the data arrives unprocessed, converted, or calibrated.

Dialog Buttons

There are two non-standard buttons on the Add Parameter dialog. They are described below.

Filter

The Filter button along with the Filter field and Filter By radio buttons provide a way to filter the list of parameters. The Filter By radio buttons are used to indicate which column to use for the filter. The Filter field is used to specify the filter criteria. If you leave the Filter field blank all parameters will be listed. If you put a * in the Filter field all parameters will be listed. The * character can be used to match one or more characters and the ? character can be used to match a single character. For example MSID1* means match all the parameters that begin with the characters MSID1. MSID1?1 means match all the parameters that begin with the characters MSID1, followed by a single character, followed by the character 1.

Note: When a filter has two or more * characters, only the first * character will be interpreted as zero or more characters. The 2nd, 3rd, etc., instances of * will be interpreted as a literal * character. Since the Parameter field does not support * as a valid character, your filter will return no items in the list if it has more than one * character.

You can enter more than one ? character in a filter and each of them will be interpreted as any single character. However, all ? characters after the first * character are interpreted as literal ? characters.

Refresh

In some cases, you may access the Add (Parameter) dialog while there are one or more packets in the main window packet list that are initializing. In this scenario, if the packet finishes activating after you have displayed the Add (Parameter) dialog, the parameters associated with the packet will not be added to the list automatically. In order to see the parameters you must push the Refresh button. This is also true if a packet is in the process of being deleted. The parameters will not be deleted from the list automatically. You must push the Refresh button to see that the parameters are no longer available.

6.112 Modify Parameter Recording Session Dialog

The Modify Parameter Recording Session dialog is identical to the Add Parameter Recording Session dialog with regard to functionality. The main difference is that you cannot modify the parameter recording session's name when you are modifying a

parameter recording session. Please see the Add Parameter Recording Session dialog section for details about the functionality provided by the Modify Parameter Recording Session dialog.

6.113 Login Sessions Dialog

The ERIS Sessions dialog is shown in Figure 114. This dialog displays all the POIC and TReK Login sessions. These Login Sessions may or may not be in use. The dialog shows whether the Login Session is being recorded and the status of the Login Session (Inactive, Active, etc.).

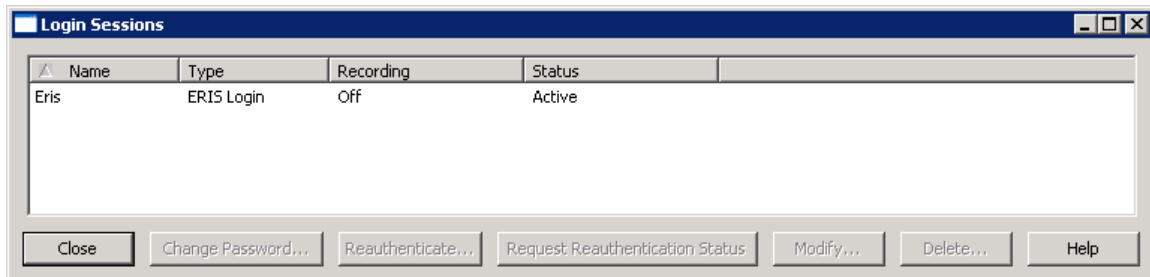


Figure 114 Login Sessions Dialog

Buttons

There are several non-standard buttons on the Login Sessions dialog. Each is described below.

Change Password

The Change Password button displays the Change Password dialog. This dialog provides a way to change the password associated with your external (POIC or TReK) user account.

Reauthenticate

The Reauthenticate button displays the Login dialog. This provides a way to reauthenticate your ERIS Login Session. This function is not applicable for TReK Login Sessions.

Request Reauthentication Status

The Request Reauthentication Status button provides a way to request reauthentication status for the selected ERIS Login Session. This function is not applicable for TReK Login Sessions.

Modify

The Modify button displays the Modify Login Session dialog. This dialog provides a way to modify the properties associated with the Login Session such as recording or viewing properties. The Modify Login Session dialog is identical to the Add Login

Session dialog. Please note that once a Login Session has been activated it will not be possible to change some of the Login Session properties such as the IP Address, port etc.

Delete

The Delete button provides a way to delete an Inactive Login Session. If a Login Session is referenced by a destination or is Active it cannot be deleted.

6.114 Set Telemetry Processing Options Dialog

The Set Telemetry Processing Options dialog is shown in Figure 115. This dialog is used to set general properties associated with telemetry processing. In some cases, changes made in this dialog can be applied to services currently in use. In other cases, the changes can only be applied the next time the service is started. For example, if you are running a display, and you change the Status Character Separator, the next time the display is updated you will see the new status character. However if you change the Packet Statistics Recording interval, any packet statistics recording currently in progress will continue to use the previous time interval. The new time interval will be applied the next time you start packet statistics recording.

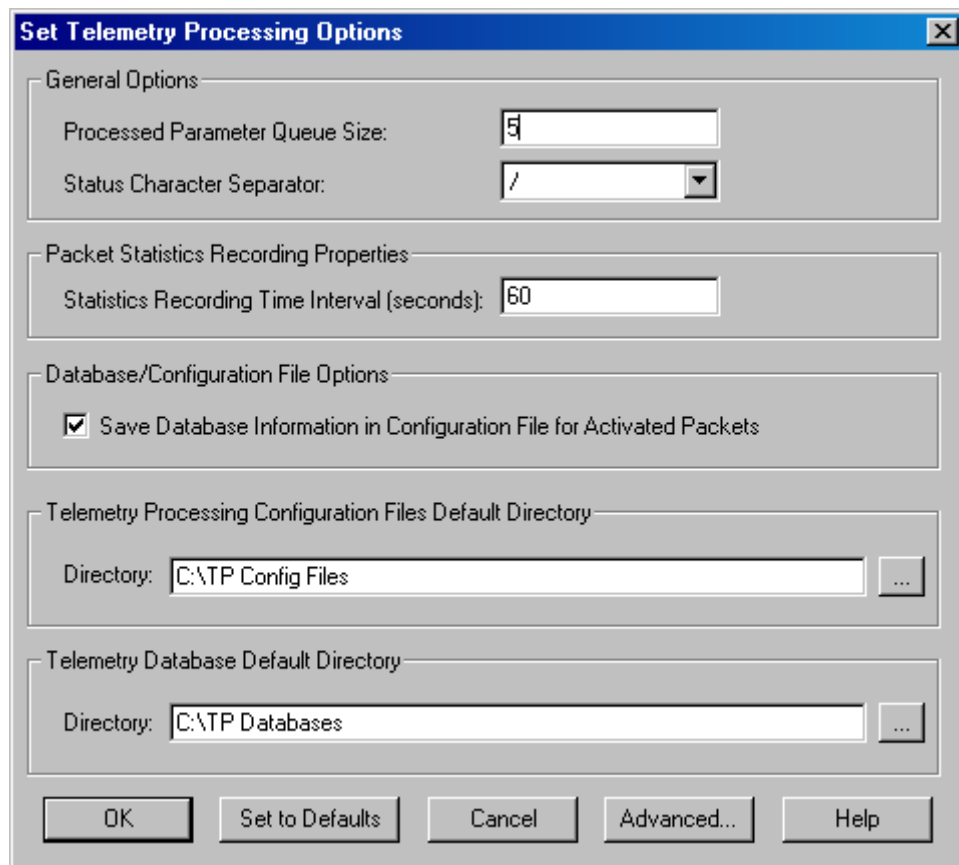


Figure 115 Set Telemetry Processing Options Dialog

Each field in the Set Telemetry Processing Options dialog is described below.

Processed Parameter Queue Size (Required Field)

The Processed Parameter Queue Size field tells your TReK system what size to make the telemetry processing system's processed parameter queue. If you are not familiar with the processed parameter queue, please refer to the TReK Telemetry Tutorial (TREK-USER-002). The Processed Parameter Queue Size field will default to 5.

Status Character Separator (Required Field)

The Status Character Separator field tells your TReK system what type of character should be used to separate the individual fields in the TReK status string. The default separator is a '/' character. An example status string using this character is: S/S/X. If you are not familiar with status strings, please refer to the TReK Telemetry Tutorial (TREK-USER-002).

Statistics Recording Time Interval (Required Field)

The Statistics Recording Time Interval property tells your TReK system how often to write statistics information to the statistics recording files. This property is only used if you are recording statistics information.

For more information about packet statistics recording please refer to section 7.8.

Save Database Information in Configuration File for Activated Packets (Required Field)

This property tells your TReK system whether to save database information in configuration files for activated packets. When you activate a packet, TReK retrieves information about the packet from the database. The default behavior is to save this database information when you save a configuration. However, if you uncheck this box, your TReK system will not save any database information for any packets regardless of whether the packet(s) are activated. This means that the next time you open the configuration file and activate the packets, TReK will access the database for information (because there will be no database information stored in the configuration file).

Telemetry Processing Configuration Files Default Directory

This property provides a way to set a user-specified default directory for configuration files. You can leave this field blank. If you leave it blank, TReK will use the following directory:

<base_path>\configuration_files\telemetry_processing directory.

The <base_path> on a Windows 2000 computer is shown below.

<base_path> = C:\Documents and Settings\<username>\Application Data\TReK

Telemetry Database Default Directory

This property provides a way to set a user-specified default directory for database files. You can leave this field blank. If you leave it blank, TReK will use the following directory:

<base_path>\database directory.

The <base_path> on a Windows 2000 computer is shown below.

<base_path> = C:\Documents and Settings\<username>\Application Data\TReK

Set to Defaults

The Set to Defaults button will reset all properties in the dialog box to the original values that were in place when the TReK software was installed.

Figure 116 shows the dialog that will appear when you push the Advanced button.

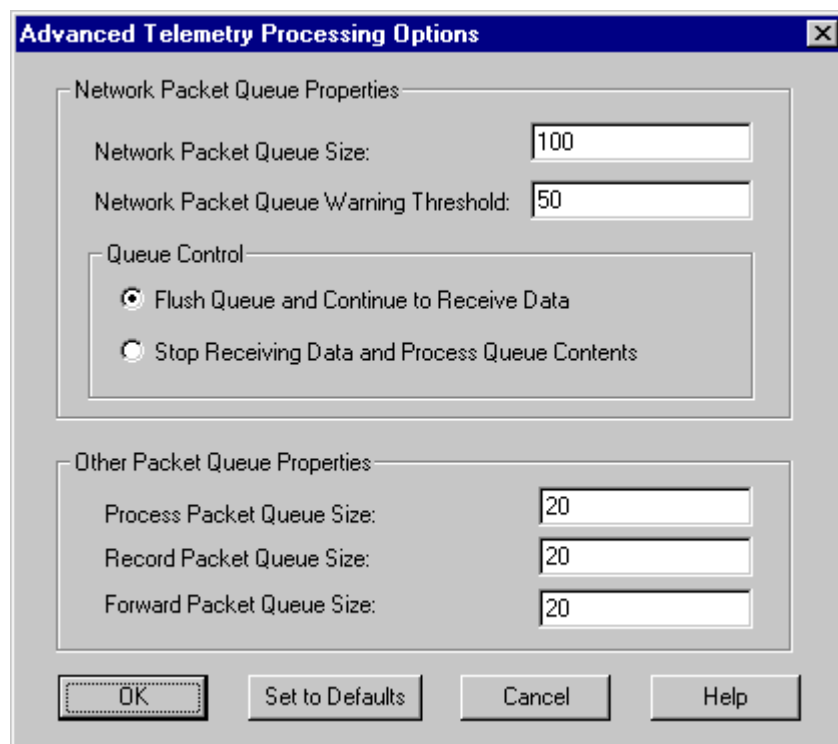


Figure 116 Advanced Telemetry Processing Options Dialog

Advanced

What's behind the Advanced Button? Things you probably don't want to know about!

Network Packet Queue Size (Required Field)

The Network Packet Queue size tells your TReK system what size to use for the telemetry processing system's network packet queue. If you are not familiar with the network packet queue, please refer to the TReK Telemetry Tutorial (TREK-USER-002). The Network Packet Queue Size will default to 100.

Network Packet Queue Warning Threshold (Required Field)

The Network Packet Queue Warning Threshold tells your TReK system what threshold to use with regard to the telemetry processing system's network packet queue. For example, if the Network Packet Queue Warning Threshold is set to 100, and the number of packets in the network packet queue reaches 101, a warning message will be displayed. This warning message will indicate that your TReK system cannot keep up and that if you do not change the current configuration you may begin to lose packets. If you are not familiar with the network packet queue, please refer to the TReK Telemetry Tutorial (TREK-USER-002). The Network Packet Queue Warning Threshold will default to 50.

Network Packet Queue Control (Required Field)

The Network Packet Queue Control information tells your TReK system what to do if the telemetry processing system's network packet queue (incoming packet queue) fills to capacity. At this point you have two choices. If you select the Flush Queue and Continue to Receive Data option, this will tell your TReK system to drop all the packets currently in the incoming packet queue. This will make room for the new packets that are arriving. If you select the Stop Receiving Data and Process Queue Contents option, this will tell your TReK system to stop placing new packets in the network packet queue and process all the existing packets in the queue. This means that you lose the new packets that are arriving.

Process Packet Queue Size (Required Field)

The Process Packet Queue size tells your TReK system what size to use for the telemetry processing system's process packet queue. If you are not familiar with the process packet queue, please refer to the TReK Telemetry Tutorial (TREK-USER-002). The Process Packet Queue Size will default to 20.

Record Packet Queue Size (Required Field)

The Record Packet Queue size tells your TReK system what size to use for the telemetry processing system's record packet queue. If you are not familiar with the record packet queue, please refer to the TReK Telemetry Tutorial (TREK-USER-002). The Record Packet Queue Size will default to 20.

Forward Packet Queue Size (Required Field)

The Forward Packet Queue size tells your TReK system what size to use for the telemetry processing system's forward packet queue. If you are not familiar with the forward packet queue, please refer to the TReK Telemetry Tutorial (TREK-USER-002). The Forward Packet Queue Size will default to 20.

Set to Defaults

The Set to Defaults button will reset all the fields in the dialog box to the original values that were in place when the TReK software was installed.

6.115 Telemetry Processing Statistics Dialog

The Telemetry Processing Statistics dialog is shown in Figure 117. This dialog provides statistics information about the telemetry processing work currently in progress. For example, you can use this dialog to display information about the number of packets received, the number of packets forwarded, etc.

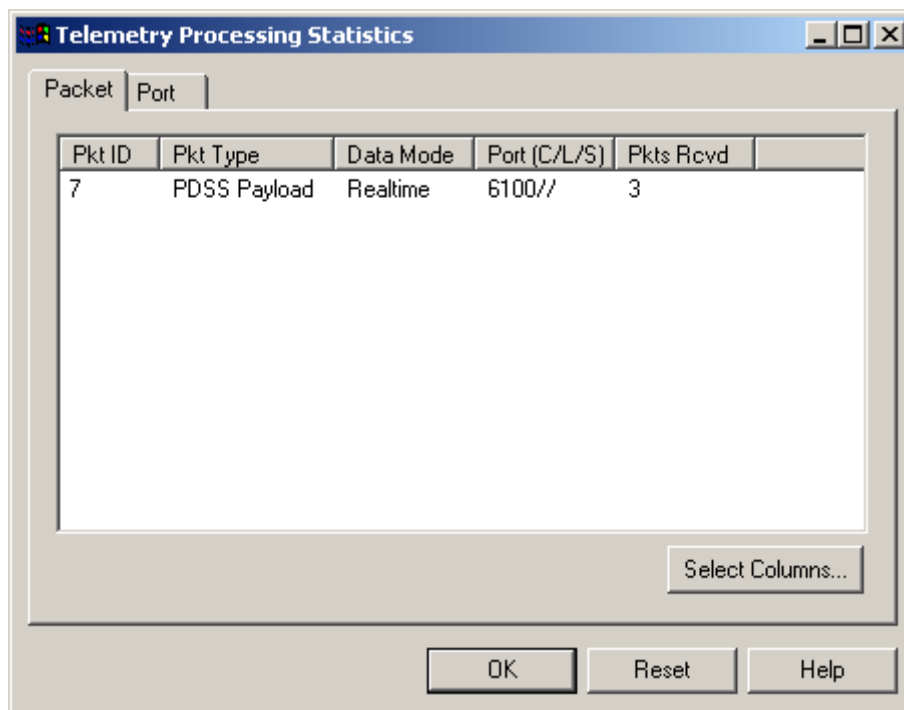


Figure 117 Show Telemetry Processing Statistics (Packet Tab) Dialog

The Telemetry Processing Statistics dialog is a tabbed dialog with two tabs: Packet and Port. The Packet tab shows statistics for each of the packets that are currently in the main window packet list. The Port tab shows statistics for each of the ports that are currently in use. Please note that the information displayed for a port shows a summary of all activity on the port. In other words if there are packets arriving at the port other than the

packets you expect (or are configured for) this will still be reflected in the port statistics information. The Packet tab is shown in Figure 117. There are fourteen columns of information that can be displayed in the Packet tab and twenty columns of information that can be displayed in the Port tab. The Port tab is shown in Figure 118.

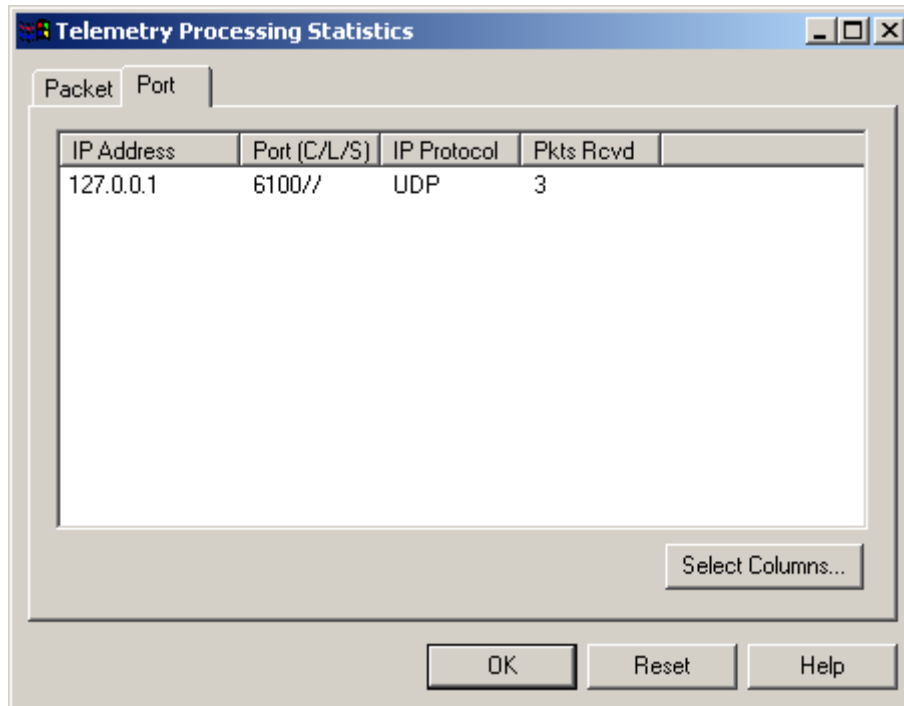


Figure 118 Show Telemetry Processing Statistics (Port Tab) Dialog

Buttons

Select Columns

There is a Select Columns button on each tab. The Select Columns button is used to identify which columns should be displayed. The Select Columns button on the Packet tab will display the Select Packet Statistics Columns dialog described in section 6.116. The Select Columns button on the Port tab will display the Select Port Statistics Columns dialog described in section 6.117.

Reset

The Reset button resets all statistics information to zero. Statistics collection will resume from that point with the count starting at zero. For example, suppose you have received 700 packets (the value 700 will be in the Pkts Rcvd column). If you push the Reset button, the Pkts Rcvd value will be reset to 0 and the 700 in the Pkts Rcvd column will be replaced with 0.

6.116 Select Packet Statistics Columns Dialog

The Select Packet Statistics Columns dialog is shown in Figure 119. This dialog is used to configure the columns in the Packet tab of the Show Telemetry Processing Statistics dialog.

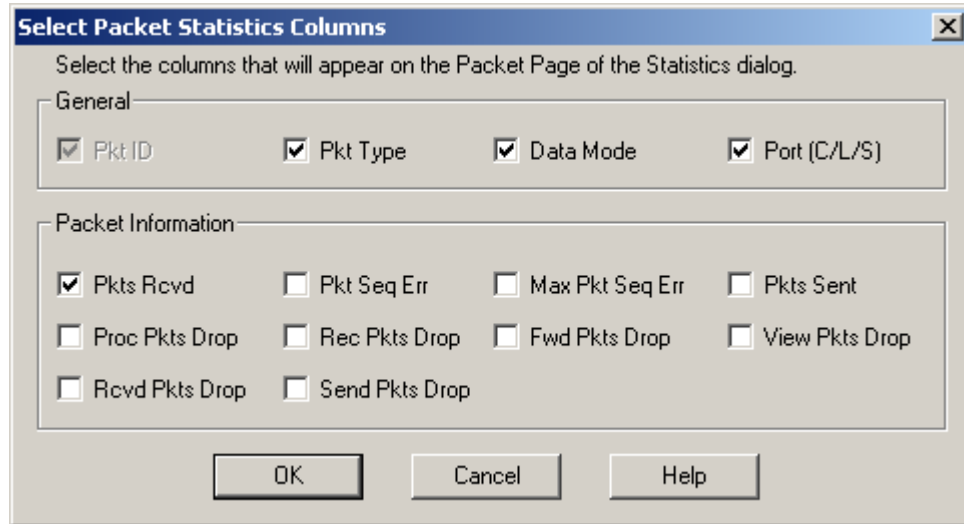


Figure 119 Select Packet Statistics Columns Dialog

Each field in the Select Packet Statistics Columns dialog is described below.

Pkt ID

Pkt ID is short for Packet ID. It represents the Packet ID (or APID). The Pkt ID column cannot be hidden.

Pkt Type

Pkt Type is short for Packet Type. If you check the Pkt Type button, the Pkt Type column will be displayed.

Data Mode

If you check the Data Mode button, the Data Mode column will be displayed.

Port (C/L/S)

If you check the Port button, the Port column will be displayed. The Port column will contain information about one or more ports associated with the packet. A packet may have a Client, Listener, or Server (C/L/S) Port associated with it. In some cases it is possible to have more than one port associated with a packet. This occurs if TReK is receiving packets via TCP. For example, if TReK is configured to listen for TCP connection requests on a particular port (which you identified when you added the packet) and a connection was established, the port column on the port tab will show two entries corresponding to the packet that you added. One of the entries will be for the Listener; the other entry will be for the Server that was created by the Listener when the connection was established. The port column on the packet tab will only contain the

Server's packet information. The Server's packet information is identified by a port entry that contains two values: the Listener's port number and the newly created Server's port number (e.g., /6100/1024). The Server's packet information is important because it is the port that is actually receiving the TCP packets. The third type of port that may be associated with a packet is a Client port. Client ports are created for UDP packet receipt, UDP packet forwarding, and TCP packet forwarding. For example, if TReK is configured to receive packets via UDP on a particular port, a Client will be created for the port. The Client's packet information is identified by a port entry in the Port column that only contains the Client's port number (e.g., 6100/).

Pkts Rcvd

Pkts Rcvd is short for Packets Received. It represents the number of packets received. If you check the Pkts Rcvd button, the Pkts Rcvd column will be displayed.

Pkt Seq Err

Pkt Seq Err is short for Packet Sequence Error. It represents the number of packet sequence errors that occurred for a packet that is being received. A packet sequence error occurs when a packet arrives out of order (i.e. TReK expects a packet with a sequence count of six but instead receives a packet with a sequence count of seven). If you check the Pkt Seq Err button, the Pkt Seq Err column will be displayed.

Max Pkt Seq Err

Max Pkt Seq Err is short for Maximum Packet Sequence Error. It represents the maximum packet sequence error that occurred for a packet that is being received. TReK determines the maximum packet sequence error by calculating the delta or difference between the expected packet sequence count and the actual packet sequence count. If you check the Max Pkt Seq Err button, the Max Pkt Seq Err column will be displayed.

Pkts Sent

The number of packets sent to a destination. If you check the Pkts Sent button, the Pkts Sent column will be displayed. Pkts Sent is not the same as packets forwarded. Pkts Sent is used to represent the number of packets sent across a socket that is configured to receive and send packets such as the CDP request (socket) interface. Pkts Sent never indicates packets forwarded. To see the number of packets forwarded, look at the Pkts Fwd column on the Port Tab.

Proc Pkts Drop

Proc Pkts Drop is short for Processed Packets Dropped. It represents the number of packets that were dropped prior to being processed. If you check the Proc Pkts Drop button, the Proc Pkts Drop column will be displayed.

Rec Pkts Drop

Rec Pkts Drop is short for Record Packets Dropped. It represents the number of packets that were dropped prior to being recorded. If you check the Rec Pkts Drop button, the Rec Pkts Drop column will be displayed.

Fwd Pkts Drop

Fwd Pkts Drop is short for Forward Packets Dropped. It represents the number of packets that you indicated should be forwarded that were dropped prior to being forwarded. If you check the Fwd Pkts Dropped button, the Fwd Pkts Dropped column will be displayed.

View Pkts Drop

Fwd Pkts Drop is short for View Packets Dropped. It represents the number of packets that you indicated should be available for viewing that were dropped prior to being viewed. If you check the View Pkts Drop button, the View Pkts Drop column will be displayed.

Rcvd Pkts Drop

Rcvd Pkts Drop stands for Received Packets Dropped. It is the number of received packets that were dropped by TReK . If you check the Rcvd Pkts Drop button, the Rcvd Pkts Drop column will be displayed.

Send Pkts Drop

Send Pkts Drop stands for Send Packets Dropped. It is the number of packets that TReK attempted to send but dropped. If you check the Send Pkts Drop button, the Send Pkts Drop column will be displayed.

6.117 Select Port Statistics Columns Dialog

The Select Port Statistics Columns dialog is shown in Figure 120. This dialog is used to configure the columns in the Packet tab of the Show Telemetry Processing Statistics dialog.

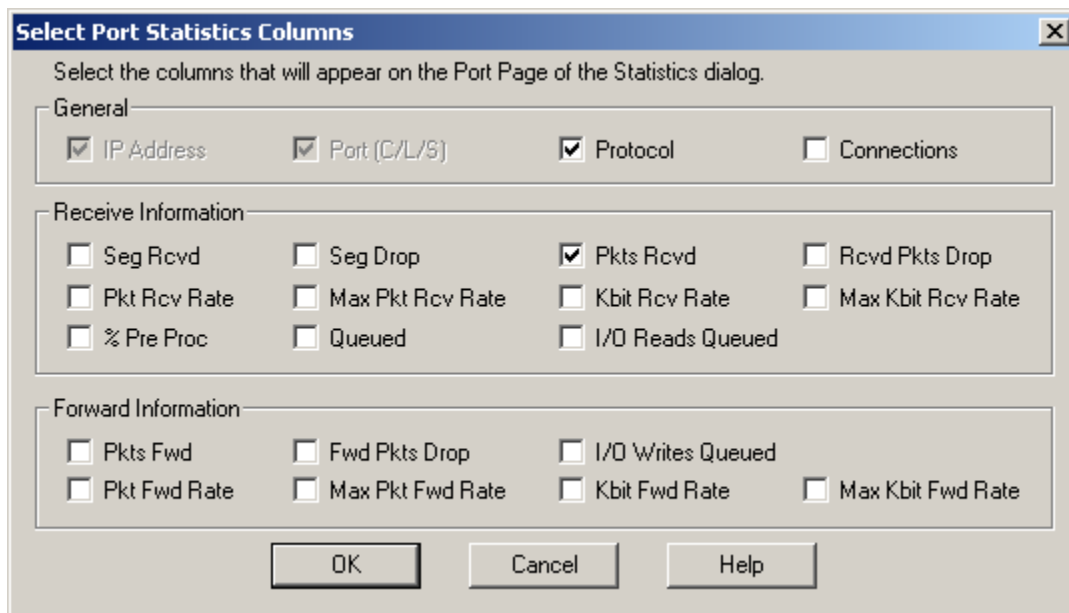


Figure 120 Select Port Statistics Columns Dialog

Each field in the Select Port Statistics Columns dialog is described below.

IP Address

IP Address. The IP Address column cannot be hidden.

Port (C/L/S)

If you check the Port button, the Port column will be displayed. The Port column will contain information about one or more ports associated with the packet. A packet may have a Client, Listener, or Server (C/L/S) Port associated with it. In some cases it is possible to have more than one port associated with a packet. This occurs if TReK is receiving packets via TCP. For example, if TReK is configured to listen for TCP connection requests on a particular port (which you identified when you added the packet) and a connection was established, the port column on the port tab will show two entries corresponding to the packet that you added. One of the entries will be for the Listener; the other entry will be for the Server that was created by the Listener when the connection was established. The Listener's port information is identified by a port entry in the Port column that only contains the Listener's port number (e.g., /6100/). The Listener's port information is important because it identifies the number of connections or Server's associated with the port. The Server's port information is identified by a port entry that contains two values: the Listener's port number and the newly created Server's port number (e.g., /6100/1024). The Server's port information is important because it is the port that is actually receiving the TCP packets. The third type of port that may be associated with a packet is a Client port. Client ports are created for UDP packet receipt, UDP packet forwarding, and TCP packet forwarding. For example, if TReK is configured to receive packets via UDP on a particular port, a Client will be created for the port. The Client's port information is identified by a port entry in the Port column that only contains the Client's port number (e.g., 6100/).

Protocol

The Internet Protocol – either UDP or TCP. If you check the Protocol button, the Protocol column will be displayed.

Connections

The number of connections associated with the port.

Seg Rcvd

Seg Rcvd is short for Segments Received. It represents the number of segments received on the port identified in the port column. This column is only applicable for TCP. If you check the Seg Rcvd button, the Seg Rcvd column will be displayed.

Seg Drop

Seg Drop is short for Segments Dropped. It represents the number of segments that TReK received and then dropped. This column is only applicable for TCP. If you check the Seg Drop button, the Seg Drop column will be displayed.

Pkts Rcvd

Pkts Rcvd is short for Packets Received. It represents the number of packets received on the port identified in the port column. If you check the Pkts Rcvd button, the Pkts Rcvd column will be displayed.

Rcvd Pkts Drop

Rcvd Pkts Drop is short for Received Packets Dropped. It represents the number of packets that TReK received and then dropped. If you check the Rcvd Pkts Drop button, the Rcvd Pkts Drop column will be displayed.

Pkt Rcv Rate

Pkt Rcv Rate is short for Packet Receive Rate. It represents the number of packets received in the last second on the port identified in the port column. If you check the Pkt Rcv Rate button, the Pkt Rcv Rate column will be displayed.

Max Pkt Rcv Rate

Max Pkt Rcv Rate is short for Maximum Packet Receive Rate. It represents the maximum packet rate seen thus far on the port identified in the port column. If you check the Max Pkt Rcv Rate button, the Max Pkt Rcv Rate column will be displayed.

Kbit Rcv Rate

Kbit Rcv Rate is short for Kilobit Receive Rate. It represents the number of kilobits per second that have been received on the port identified in the port column. If you check the KBit Rcv Rate button, the Kbit Rcv Rate column will be displayed.

Max KBit Rcv Rate

Max KBit Rcv Rate is short for Maximum Kilobit Receive Rate. It represents the maximum kilobit rate seen thus far on the port identified in the port column. If you check the Max KBit Rcv Rate button, the Max KBit Rcv Rate column will be displayed.

% Pkts Pre Proc

% Pkts Pre Proc is short for Percent of Packets Pre-Processed. It represents the percent of packets that were preprocessed on the port identified in the port column. If you check the % Pkts Pre Proc button, the % Pkts Pre Proc column will be displayed.

Queued

Queued represents the number of packets or segments that are currently queued on the port identified in the port column. The packets or segments are queued and ready to be processed, recorded, forwarded, or viewed. If you check the Queued button, the Queued column will be displayed.

I/O Reads Queued

The number of input/output reads queued.

Pkts Fwd

Pkts Fwd is short for Packets Forwarded. It represents the number of packets that were forwarded from the port identified in the port column. If you check the Pkts Fwd button, the Pkts Fwd column will be displayed.

Fwd Pkts Drop

Fwd Pkts Drop is short for Forward Packets Dropped. It represents the number of packets that TReK attempted to forward but dropped. If you check the Fwd Pkts Drop button, the Fwd Pkts Drop column will be displayed.

I/O Writes Queued

The number of input/output writes queued.

Pkt Fwd Rate

Pkt Fwd Rate is short for Packet Forward Rate. It represents the number of packets forwarded in the last second on the port identified in the port column. If you check the Pkt Fwd Rate button, the Pkt Rcv Rate column will be displayed.

Max Pkt Fwd Rate

Max Pkt Fwd Rate is short for Maximum Packet Forward Rate. It represents the maximum packet forward rate seen thus far on the port identified in the port column. If you check the Max Pkt Fwd Rate button, the Max Pkt Fwd Rate column will be displayed.

Kbit Fwd Rate

Kbit Fwd Rate is short for Kilobit Forward Rate. It represents the number of kilobits per second that have been forwarded on the port identified in the port column. If you check the KBit Fwd Rate button, the Kbit Rcv Rate column will be displayed.

Max KBit Fwd Rate

Max KBit Fwd Rate is short for Maximum Kilobit Forward Rate. It represents the maximum kilobit forward rate seen thus far on the port identified in the port column. If you check the Max KBit Fwd Rate button, the Max KBit Fwd Rate column will be displayed.

6.118 Recorded Data Viewer Dialog

The Recorded Data Viewer is used to view data that is stored in a TReK recording file. The Recorded Data Viewer can be used to view any type of TReK recording file: ERIS messages, commanding messages, or telemetry data. The Recorded Data Viewer works in a Pulse mode. The Recorded Data Viewer dialog is shown in Figure 121. First you

use the Configure dialog to identify the recording files you would like to view. Then you can start the viewing session by pushing the Start button. The Recorded Data Viewer will display the amount of data (messages/packets) based on the Pulse Rate that you identified in the Configure dialog. Each time you would like to view the next set of data you push the Pulse button. You can stop at any time by pushing the Stop button. You can clear the display by pushing the Clear button. Note the black box next to the Status field in Figure 121. This box changes color based on the activity in progress. For instance, it will be black when the Recorded Data Viewer has not been configured. It will alternate between green and red once the Start button has been pushed. It will turn green when data is available, and it will turn red when all the data has been played back and there is no more data available.

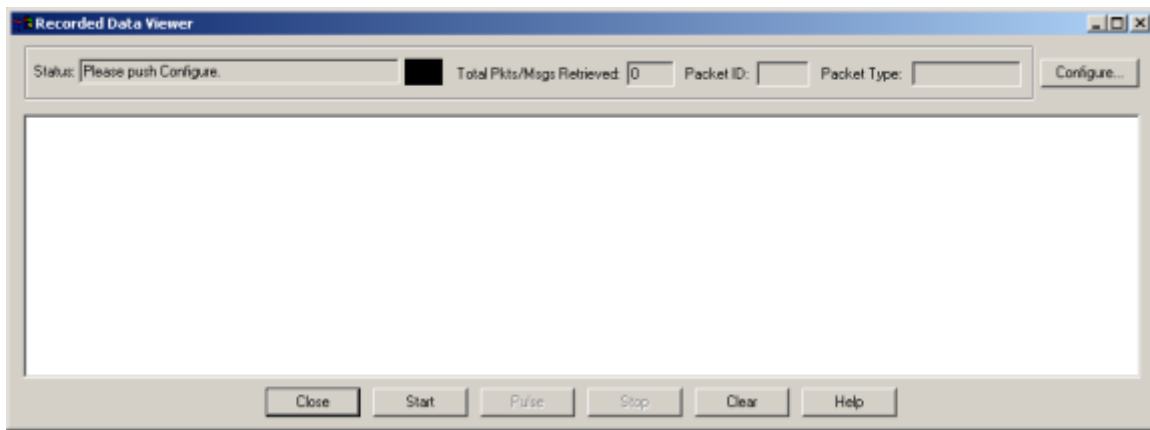


Figure 121 Recorded Data Viewer Dialog

Each field in the Recorded Data Viewer dialog is described below.

Status

This Status field displays a text message to indicate the status of the Recorded Data Viewer.

Total Pkts/Msgs Received

The Total Pkts/Msgs Received field displays the number of packets or messages that have been retrieved from the recording files. This number will increment each time you push the Pulse button so you know the total number of packets or messages that have been viewed thus far.

Packet ID

This is an identifier that is associated with the recorded data. For telemetry data this is the packet ID or APID. This is N/A for ERIS and command data.

Packet Type

This is the packet type associated with the recorded data: ERIS, PDSS Payload, Suitcase Simulator, EHS Command, etc.

Buttons

There are several non-standard buttons on the Recorded Data Viewer dialog. Each is described below.

Configure

The Configure button displays the Configure dialog which provides a way to identify the recording files you wish to view. This dialog also provides a way to configure the pulse rate. This dialog is discussed in section 6.119.

Start/Replay

The Start button is used to start a viewing session. Once the recorded data viewing has started, you use the Pulse button to request more data. If you push the Stop button or the recorded data viewing session completes (you hit the end of the recorded data files), then the Start button will be re-labeled Replay. At this point Replay will start the recorded data viewing session at the beginning (at the Start Time).

Pulse

The Pulse button will display the next set of data retrieved from the recording files.

Stop

The Stop button will stop the recorded data viewing session. At this time you can replay the data or you can reconfigure the Recorded Data Viewer to view a different set of recording files.

Clear

The Clear button will clear all the text in the Recorded Data Viewer window.

6.119 Configure (Recorded Data Viewer) Dialog

The Configure dialog is shown in Figure 122. This dialog is used to configure the Recorded Data Viewer. You can only view one type of data at a time. For example, you cannot identify recording files that contain ERIS messages and recording files that contain telemetry data. If you identify more than one set of recording files, they must contain the same type of data. Please note that the TReK Receipt Time/Spacecraft Time buttons are only used when working with recording files that contain telemetry data. These buttons are ignored if the recorded data is ERIS data or commanding data. When viewing telemetry data all the data must be from the same packet ID (APID). For example, you cannot view both Packet ID 7 and Packet ID 2 data at the same time. If you are familiar with the Add A Playback Packet dialog then the Recorded Data Viewer may look somewhat familiar. This is because the information you enter to work with the Recorded Data Viewer is similar to the information you would enter to set up a local TReK playback. When you use the Recorded Data Viewer TReK is basically performing a playback. However instead of the data being played back through your TReK system, it is only being made available for viewing in the Recorded Data Viewer dialog. This is

why the Configure dialog may look familiar. Many of the fields are similar or identical to the fields in the Add A Playback Packet dialog. Please remember that while the fields are similar the function is different. When you use the Recorded Data Viewer the data is only available for viewing in the Recorded Data Viewer window. It is not available from the TReK API because it is not being played back through your TReK system. (Note: If you would like to have the playback data available in a viewer and through the API, use the Add A Playback Packet dialog to add a playback packet and turn packet viewing on.)

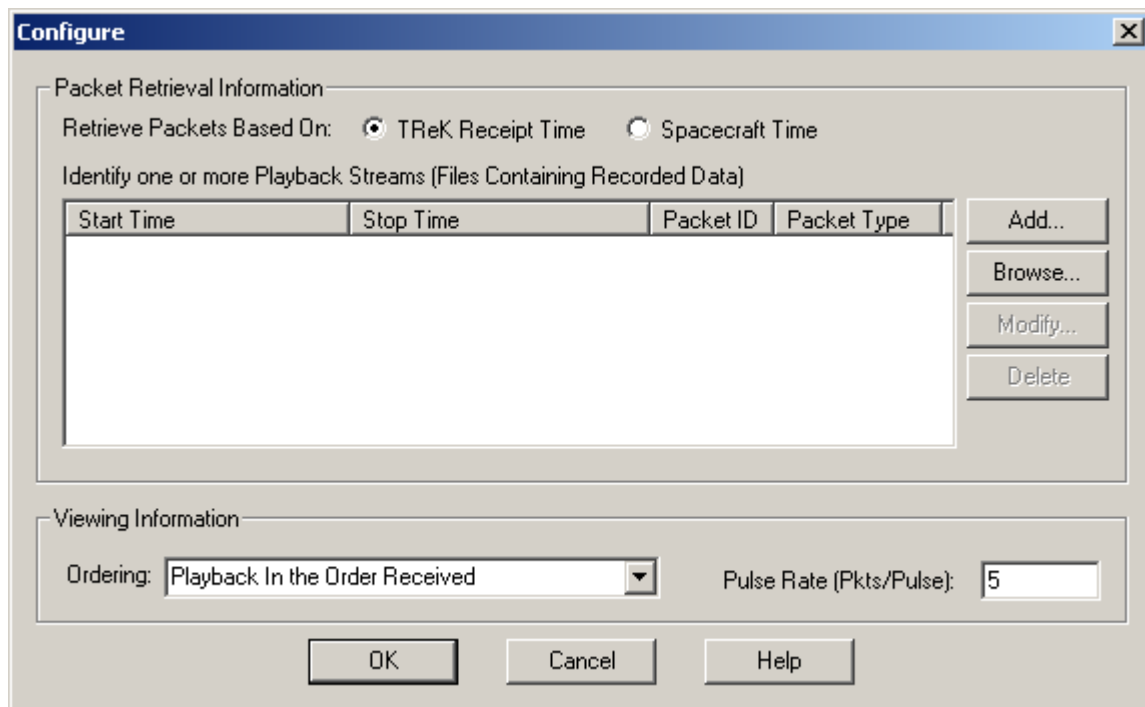


Figure 122 Configure (Recorded Data Viewer) Dialog

Each field in the Recorded Data Viewer dialog is described below.

Retrieve Packets Based On (Required Field for Telemetry Data)

This option tells your TReK system whether to use TReK Receipt Time or Spacecraft Time when telemetry packets are retrieved from the data recording files for viewing. Spacecraft Time refers to the Embedded Time that is located in the CCSDS secondary header for PDSS Payload packets and Suitcase Simulator packets.

Playback Stream List (Required Field)

This playback stream list displays each set of recording files that you have identified. For each set of recording files, the entry will show the Start Time, Stop Time, Packet ID, and Packet Type associated with those recording files.

Ordering (Required Field)

Ordering identifies the ordering that TReK should use when displaying the data that has been retrieved from the recording files. For example, you can select to display the data in the order it was received, display the data after it has been reordered based on time, or

display the data after it has been reordered based on time and all duplicates have been removed. Duplicates can occur if you have identified multiple sets of recorded data that overlap in time. This can occur if you are working with recording files that contain both realtime data and dump data. There may be some timeframe in which the same packets were recorded in both sets of recording files. In this situation you may want to identify both sets of recording files in order to merge them together into one contiguous time frame, but you want to remove any duplicates that were the result of the time overlap.

Note: When working with ERIS data files, command data files, or sentinel data files please select 'Playback In The Order Received'. Since these types of data do not contain a sequence count or an embedded time, these packets cannot be re-ordered.

Pulse Rate (Pkts/Pulse) (Required Field)

The number of packets or messages to display each time the Pulse button is pushed.

Buttons

There are several non-standard buttons on the Configure Recorded Data Viewer dialog. Each is described below.

Add

The Add button displays the Add dialog described in section 6.120. It is used to add information about a set of TReK recording files.

Browse

The Browse button displays the Windows Open dialog which can be used to select one or more TReK recording files.

Modify

The Modify button is only available when an item in the list is selected. Modify provides a way to edit an item from the list.

Delete

The Delete button is only available when an item in the list is selected. Delete provides a way to delete an item from the list.

6.120 Add (Configure Recorded Data Viewer) Dialog

The Add dialog is shown in Figure 123. This dialog provides a way to identify one set of recording files.

Figure 123 Add (Configure Recorded Data Viewer) Dialog

Each field in the Add (Configure Recorded Data Viewer) dialog is described below.

Start Time (Required Field)

The Start Time information tells your TReK system where to start the recorded data viewing. You can choose to start the viewing at any location within the time span associated with the recorded data. The start time does not have to be an exact match with the start time on any of the files. It can be any time before or after the start time on the first file. Please remember that the Start Time is a TReK receipt time for ERIS and command data.

Stop Time (Required Field)

The Stop Time information tells your TReK system where to stop the playback. You can choose to stop the recorded data viewing at any location within the time span associated with the recorded data. The stop time does not have to be an exact match with the stop time on any of the files. It can be any time after the start time on the first file. Please remember that the Stop Time is a TReK receipt time for ERIS and command data.

Original Base Filename (Required Field)

The Original Base Filename field is used to tell your TReK system the Base Filename you used when you originally recorded the data. Be sure to enter exactly what you entered when you originally recorded the data. For example, if you used the name “pkt7” for the Base Filename when you recorded the data, then you should enter “pkt7” in the Original Base Filename field. (Note: File extensions are not required but they are allowed.)

Original Recorded Data Directory (Required Field)

The Original Recorded Data Directory field is used to tell your TReK system where the original data recording files are stored. This field requires a complete directory path. An example of this is C:\MyRecordingFiles\. If you don't like to type or you need help defining the complete path, you can push the ... (dot dot dot) button located to the right of the Original Recorded Data Directory field. This will bring up a Windows Browse for

Folder dialog which you can use to identify the local directory path where your recorded data files are stored. The Browse for Folder dialog is not described in this document since it is a typical Windows dialog box. If you need help with this dialog, please refer to your Windows on-line help.

6.121 Extract Data From TReK Recording Files Dialog

The Extract Data From TReK Recording Files Dialog is a wizard that helps you through the process of extracting data values from data recording files you created with the Telemetry Processing application. Data is extracted on a parameter basis. There are four steps that need to be completed when extracting data: (1) Identify Sets of Data Recording Files, (2) Select Parameters To Extract from Data Recording Files, (3) Set Extraction Options, and (4) Run Extraction. Each step is described below. Please note that the dialogs that make up the extraction wizard are very similar to other dialogs in the Telemetry Processing application. Therefore instead of repeating material here, this section will reference other sections for details.

Step 1

The Extraction Wizard (Step 1) dialog is shown in Figure 124. This dialog is used to identify one or more sets of data recording files. For example, you may want to extract data values from recording files that contain realtime data from APID 7 and from recording files that contain dump data from APID 7. To complete step 1, you will need to identify a database, identify one or more sets of data recording files, and then push the Build Parameter List button. Be sure to wait until you have identified all the recording files you are interested in before pushing the Build Parameter List button. When you push the Build Parameter List button, this will create a list of all the parameters that are in the data recording files you identified. This list is used in Step 2. Be sure to watch the Status field for helpful hints during Step 1. For information about the dialog that appears when you push the Add button, please see section 6.119. While section 6.119 describes how to configure the recorded data viewer, the process is very similar to the process of adding one or more sets of recorded data files for extraction.

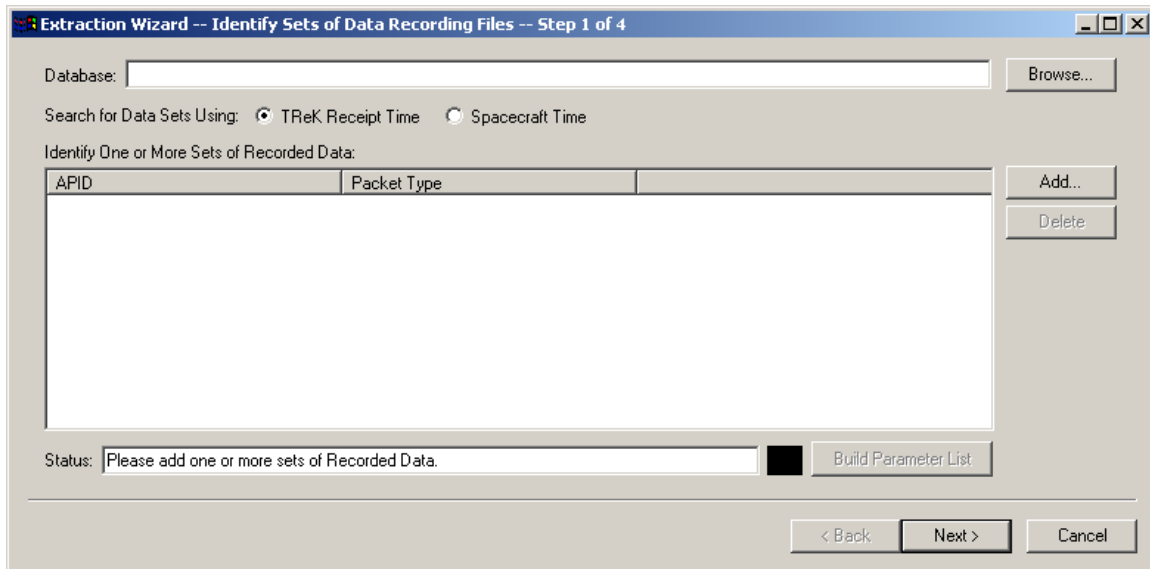


Figure 124 Extraction Wizard (Step 1) Dialog

Step 2

Once the Parameter List is available, you can push the Next button to move to Step 2. The dialog shown in Figure 125 will be displayed. This dialog provides a way to identify the list of parameters you would like to have extracted from the data recording files. The Add button can be used to add one or more parameters to the list. The other buttons can be used to specify the parameter order in the file and the processing that should be applied to each parameter value extracted. Please reference section 6.111 for more information about the Add dialog and section 6.110 for more information about the buttons on this dialog.

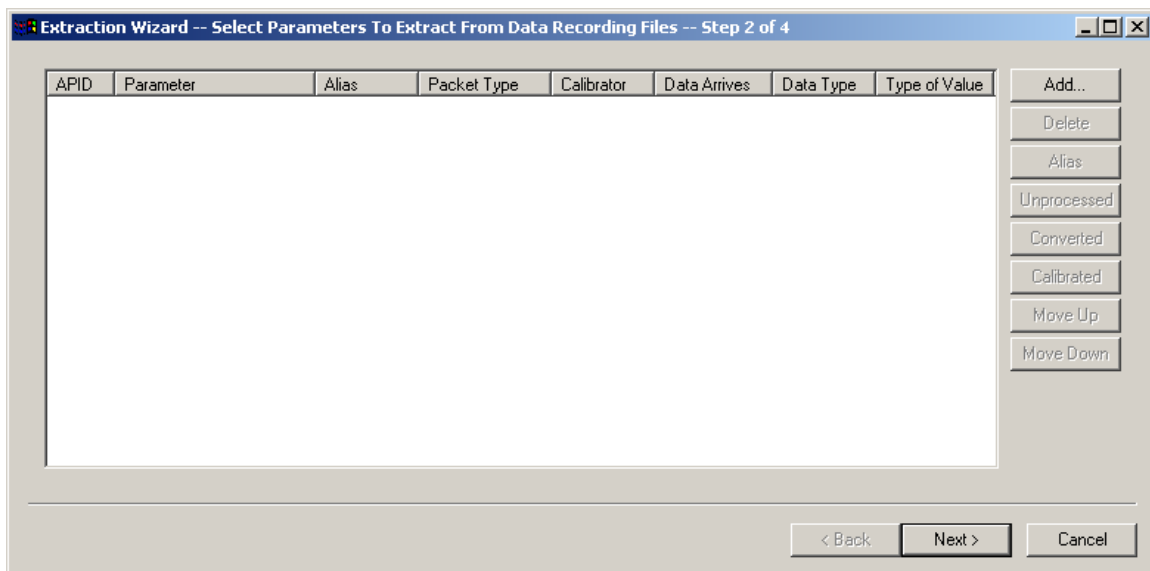


Figure 125 Extraction Wizard (Step 2) Dialog

Step 3

Once you have identified the parameters to be extracted, you can push the Next button to move to Step 3. The dialog shown in Figure 126 will be displayed. This dialog provides a way to set the options associated with the extraction. These options are very similar to the options that are available when configuring a parameter recording session. Please reference section 6.110 for more information about these options.

Extraction Wizard -- Set Extraction Options -- Step 3 of 4

Extraction Properties

Extraction Frequency:

☒ Extract Every Packet ☐ Extract On Interval (milliseconds): 1000 ☐ Extract Only On Change

Extraction File Content Preferences

Columns: ☒ APID ☒ Parameter ☐ Alias ☐ Packet Type ☒ Type of Value

Delimiter: Comma

Extraction File Properties

Base Filename:

Directory: ...

Maximum File Size (bytes): 10485760

< Back Next > Cancel

Figure 126 Extraction Wizard (Step 3) Dialog

Step 4

Once you have configured the extraction options, you can push the Next button to move to Step 4. The dialog shown in Figure 127 will be displayed. This dialog is used to Start the extraction process. During the extraction process, the Status area will display messages that describe the status of the extraction. When the extraction process finishes, the status color box will turn green. The Stop Extraction button is available in case you need to stop the extraction before it finishes. Once the extraction has finished, push the Finish button to exit the Extraction Wizard.

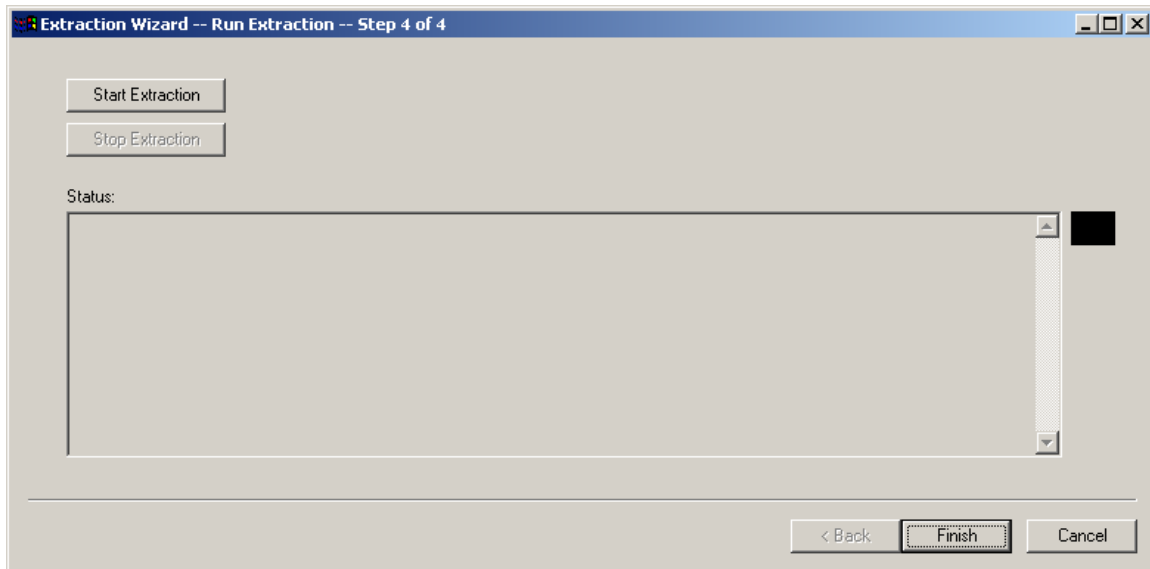


Figure 127 Extraction Wizard (Step 4) Dialog

6.122 Convert Data Storage Manager Files Dialog

The Convert Data Storage Manager Files dialog is shown in Figure 128. This dialog is used to move data stored in a Data Storage Manager data file (retrieved from the POIC) into TReK Recording Files. You can then use the Add A Playback Packet feature to play the data back.

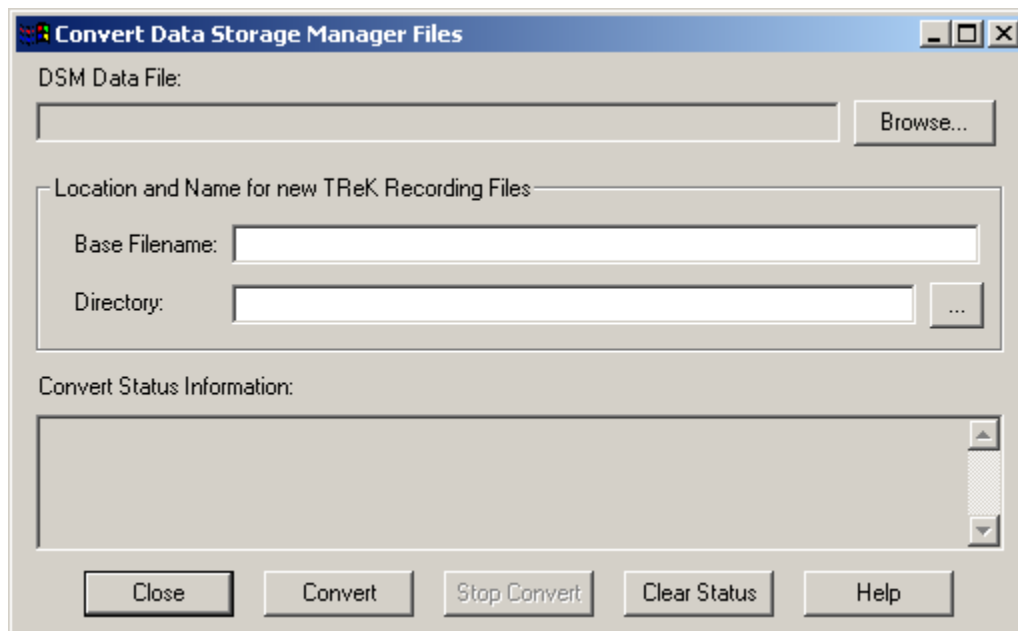


Figure 128 Convert Data Storage Manager Files

Each field in the Convert Data Storage Manager Files dialog is described below.

DSM Data File

This is the Data Storage Manager Data File that was created by the POIC. There are two files that are created when you request data from the POIC Data Storage Manager: a data file and a Retrieval Processing Summary Message (RPSM) file. The Browse button is used to identify the location of the DSM data file. When you transfer the files to your TReK system, please place the files in the same directory. TReK expects to find the RPSM file in the same directory as the data file. It also expects the RPSM file to have the same base filename as the data file. For example, if the data file is named “apid700”, TReK expects the RPSM file to be named “apid700.rpsm”. Therefore, when using the POIC’s Data Storage Manager capability, please name the data file and the RPSM file with the same base filename. If the RPSM file has a different base filename or cannot be located in the same directory, TReK will still attempt to convert the data file. However, the contents of the RPSM file will not be available. If the RPSM file is available, content information will be printed in the Convert Status Information field. If the RPSM file is not available, the message “RPSM data zone content is unavailable” will be printed in the Convert Status Information field.

Base Filename

The base filename to use for the new TReK recording files that are created.

Directory

The directory to use for the new TReK recording files that are created.

Convert Status Information

This Convert Status Information field contains a list of status messages that will be generated during the convert process. This field will indicate whether the convert process completed successfully or whether any errors occurred. During the conversion process, TReK will attempt to read the RPSM file. If an RPSM file is available, RPSM Data Zone Content information will be written to the status area.

Buttons

There are several non-standard buttons on the Convert Data Storage Manager Files dialog. Each is described below.

Convert

The Convert button starts the Convert process.

Stop Convert

The Stop Convert button will stop the convert process. It is only available while a convert is in progress.

Clear Status

The Clear Status button will clear the messages in the Convert Status Information field.

6.123 Delete Packet Warning Message Dialog

The Delete Packet Warning message dialog will appear if you attempt to delete a packet from the packet list in the main window. If you are sure you want to proceed answer Yes. If you do not want to proceed answer No and no action will be taken.

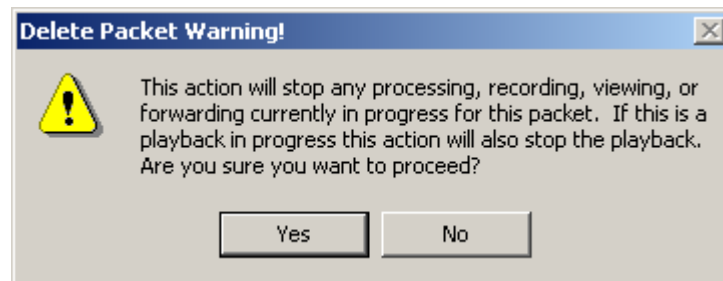


Figure 129 Delete Packet Warning Message Dialog

6.124 Invalid Configuration Information Dialog

The Invalid Configuration Information dialog is shown in Figure 130. This dialog only appears if you attempt to open a configuration file that contains invalid configuration information. This usually happens when you move a configuration file from one machine to another. For example, when you save a configuration file, the packets and all the information associated with the packets (including the IP address information and the location of the database file) are stored in the configuration file. If you move the configuration file, then some of this information will no longer be valid.

The Invalid Configuration Information dialog contains two lists. The list at the top of the dialog contains a list of the packets that are stored in the configuration file. If the packet contains any invalid information it will be red. When you select a packet in the packet list, the list located below the packet list will display all the invalid items associated with that particular packet.

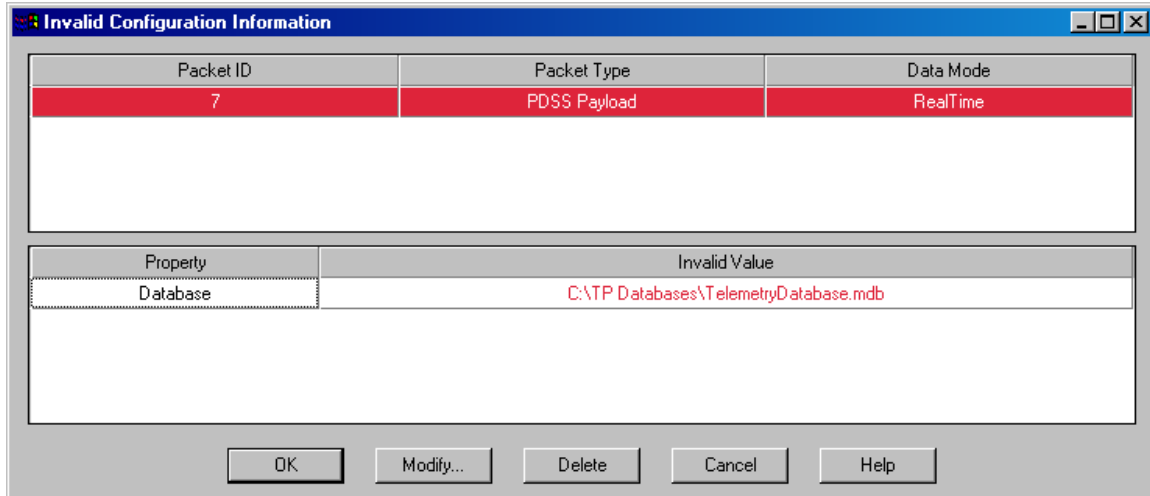


Figure 130 Invalid Configuration Information Dialog

Buttons

Modify

When you select a packet in the packet list and push the Modify button, the Packet Properties dialog will be displayed. The Packet Properties dialog can be used to change the properties that are invalid.

Delete

Selecting the Delete button will delete the packet from the configuration. The configuration file will not be changed unless you perform a save after the configuration file has been successfully opened.

Cancel

Selecting the Cancel button will abort the entire process and leave the configuration file unchanged.

6.125 Close Configuration Warning Message Dialog

The Close Configuration Warning message dialog will appear if you attempt to perform a New or Open and there are packets in the packet list. If you are sure you want to proceed answer Yes. If you do not want to proceed answer No and no action will be taken.

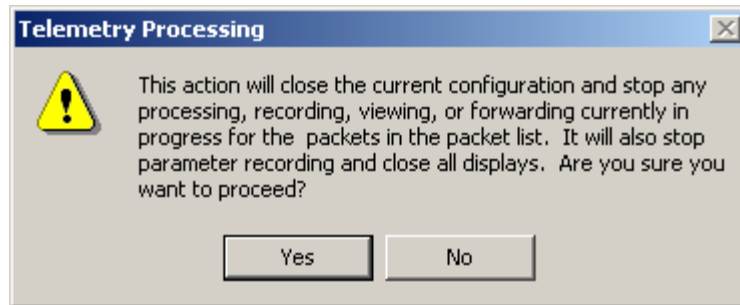


Figure 131 Close Configuration Warning Message Dialog

6.126 Save Changes Message Dialog

If you select New, Open, or Exit, and the current configuration has not been saved, the Save Changes message dialog will be displayed. If you are exiting the application, the application will Exit after you respond to the Save Changes dialog.

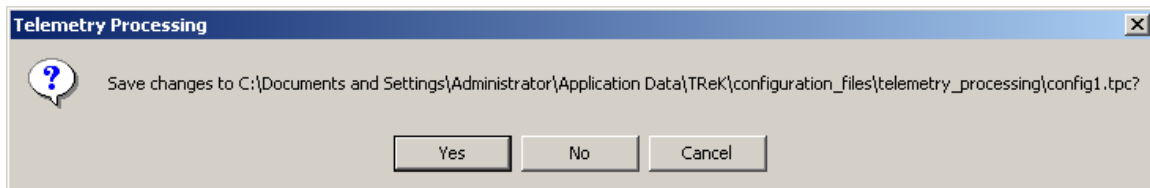


Figure 132 Save Changes Message Dialog

6.127 Exit Confirmation Message Dialog

The Exit Confirmation message dialog is displayed to help you avoid exiting the Telemetry Processing application by accident. It will only be displayed if you exit the application with the current configuration unchanged. If the configuration has changed you will be prompted with the Save Changes dialog instead of the Exit Confirmation dialog. If you are prompted with the Exit Confirmation dialog and you are sure you want to exit answer Yes. If you do not want to exit the application answer No and the application will not proceed with the exit.

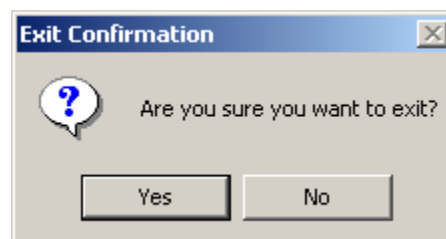


Figure 133 Exit Confirmation Message Dialog

7 Special Topics

This section addresses a few of the special topics associated with the Telemetry Processing application. The information in this section can be useful in understanding why you have to enter some of the information required in some of the dialogs

7.1 How does data recording work?

When data is recorded on your TReK system a complete copy of the raw packets along with the TReK receipt time associated with their arrival are stored in one or more files in a local directory. In addition, if the packet contains a Consultative Committee for Space Data Systems (CCSDS) secondary header, the spacecraft time information contained inside this secondary header is processed and also stored in the file (PDSS payload packets are one example of packets containing this secondary header).

The name of each recording file is specified in part by you and in part by your TReK system. This is an example of a TReK Receipt Time (TRT) data recording filename:

```
TRT 2004-08-05 18~19~55~109 2004-08-05 18~20~04~109 packet7
```

If the packet contains a CCSDS secondary header an additional filename containing the Spacecraft Time (SCT) reference will be generated. This is an example of a spacecraft time data recording filename:

```
SCT 2004-08-05 17~49~55~105 2004-08-05 17~50~04~105 packet7
```

The first part of the TRT filename (2004-08-05 18~19~55~109) indicates the time of arrival of the first packet in the file in Greenwich Mean Time (GMT). The second part of the filename (2004-08-05 18~20~04~109) indicates the time of arrival of the last packet in the file in GMT. The SCT filename is interpreted in a similar manner except the start and stop times reference the spacecraft time contained in the CCSDS secondary header of the first and last packet in the file. The start time and stop times identify the time span associated with the data stored in the file. The last part of the filename (packet7) is called the base filename. When you set up data recording you will be asked to provide a base filename for your data recording files as well as the path for a local directory where the files should be stored.

If you have selected to record a packet, the following sequence of recording events will occur when the packets arrive:

- Packet arrives
- Packet is identified
- The packet will be stored in the file.

- If the data recording file is full or the Maximum Time File Is Open property has expired, the file will be closed and renamed with the TRT filename. If the packet contains a CCSDS secondary header, the SCT filename will also be created in the form of a shortcut to the recorded data file. A new data recording file will then be opened (marked with the GMT TReK receipt start time) and the next packet will be stored in the new file.

Your TReK system uses the Maximum File Size property and or the Maximum Time File Is Open property to determine when a file should be closed. Please keep in mind that if you are using the Maximum Time File Is Open property to close your recording files, the open file timer associated with your record file will start when the first packet is recorded. This means that if no packets are recorded, the file will remain open until you close it manually. The Maximum File Size property and the Maximum Time File Is Open properties can be set in the Set Telemetry Processing Options dialog box (see section 6.114) or the Advanced Packet Recording dialog box (see section 6.33).

7.2 How do I set up a Pass-Thru Packet?

If you want to use the Pass-Thru capability you need to add your Packet ID (APID) to your TReK Telemetry Database if it doesn't already exist. Otherwise you will not be able to add your packet to the packet list in the main window. The Add A Packet dialog will stop you because it will know that the Packet ID is not in the database. For more information about adding a Packet ID to the Telemetry Database, please refer to the TReK Telemetry Database User Guide (TREK-USER-005).

7.3 What do I do if my TReK system can't keep up and I start losing packets?

If your TReK system cannot handle the amount of telemetry processing work that you have requested, you will receive one or more warning messages stating that you are either about to lose packets or are already losing packets. These messages may direct you to the Show Telemetry Processing Statistics dialog which contains information you can use to evaluate your TReK system's performance.

In some cases, the only action you can take is to take some of the load off of your machine. With experience you will learn how much work your machine can handle. One of the easiest actions to take is to shut down one or more applications. This can free up precious resources that can be used for telemetry processing work. Another easy way to ease the load is to delete one or more packets from the packet list in the main window.

7.4 Can I record my data and play it back at a different rate?

Yes. If you have data that is arriving at a rate that is too fast to be processed by your TReK system you can record the data and then play it back at a slower rate. You would

do this by adding the packet to the packet list with Type of Processing set to Off and Recording set to On. After you have finished recording the data, you can use the Add A Playback Packet dialog to add a playback packet to the packet list. In the Add A Playback Packet dialog box you can use the Specify Rate field to set the data rate for the playback.

7.5 Is database information retrieved when I activate a packet?

The answer to this question is: It depends. There are several different scenarios that can occur. Each one is described below.

Scenario 1

Suppose you have several packets in the main window packet list, none of the packets have been activated, and all of the packets were added using the Add A Packet or Add A Playback packet dialog (versus using a configuration file). Each time you activate one of the packets, the database information associated with packet will be retrieved from the database. However, there is one important thing to note:

If the packet contains a measurement or processing element (calibrator, sensor, switch, or monitor) that has already been retrieved from the database since it was associated with a packet that has already been activated, then information for that measurement or processing element will not be retrieved again.

So getting back to our scenario ... suppose you have packet 2 and packet 7 in the main window packet list and neither has been activated. You activate packet 2 first and one of the measurements in packet 2 references a calibrator called calibrator1. Next you activate packet 7 and it also contains a measurement that references calibrator1. What happens? Well, when you activate packet 7, the information for calibrator1 will not be retrieved from the database a second time. The information that was retrieved the first time will continue to be used and will not be overwritten with new information from the database. This ensures that if you have changed the properties of calibrator1 then these new properties will not be overwritten with the original information stored in the database. It also means that when you want to make updates in realtime you should make them through the Telemetry Processing application. The other alternative is to be sure that you make the changes in the database before you start activating any packets that share measurements or processing elements.

Scenario 2

If you have saved a configuration that contains packets that were activated before you performed the save, all the database information associated with those packets will be saved in your configuration file. This means that the next time you open the configuration file and you activate those packets, the database information that was stored in the file will be used (versus retrieving new information) from the database. This is why a packet that has been previously activated and stored in a configuration file

activates so quickly. There is no database retrieval involved and the activation process proceeds much more quickly.

Scenario 3

The Set Telemetry Processing Options dialog has an option called “Save Database Information in Configuration File for Activated Packets”. The default setting for this property is “On”. When you activate a packet, TReK retrieves information about the packet from the database. The Telemetry Processing application will save this database information when you save a configuration. You can change this default behavior by unchecking the “Save Database Information in Configuration File for Activated Packets” property checkbox. If you do this your TReK system will not save any database information for any packets regardless of whether the packet(s) are activated. This means that the next time you open the configuration file and activate the packets, TReK will access the database for information (because there will be no database information stored in the configuration file).

7.6 How do I interpret the colors in the Telemetry Processing main window?

Colors are used in the Telemetry Processing main window to convey information about each packet’s data receipt status. There are several different states (colors) that are used to represent a packet’s data receipt status. These states are: No Status, Initializing, No Data Available, No New Data, Receiving Data, and Status Unknown. You can change the colors used for each data receipt status using the Set Color Preferences dialog box.

TReK checks on the data receipt status of each packet based on the packet’s “Expected Packet Rate” property. The “Expected Packet Rate” property is defined when the packet is added to the main window packet list (via the Add A Packet dialog). The data receipt status is determined by evaluating whether any packets containing the data arrived in the expected time interval. This technique is used in order to avoid the display flicker that might occur if the color is changed every time a single packet arrives.

For example, suppose you add a packet and set the Expected Packet Rate property to 1.0 packet/sec. This tells your TReK system that it should expect data for this packet to arrive once a second. This means that once a second TReK will check to see if any data has arrived. If data has arrived, then the data receipt status will be set to Receiving Data (default color is green). If no new data has arrived, then the data receipt status will be set to No New Data (default color is gold). This means that the color you see for a packet is directly affected by the value you enter for the Expected Packet Rate property. If you expect that your data will arrive once a second, but it only arrives every two seconds, this means that the data receipt status of the packet will toggle between Receiving Data and No New Data. This indicates that data is not arriving in the time interval you expected. However, if you expect your data to arrive once a second and it does arrive within the one second interval (between checks) then the color of the packet will stay a constant green to indicate that you are receiving data as you expected.

7.7 How is machine performance affected by Port Number selections?

When you add a packet to the packet list in the main window, part of the information you provide in the Add A Packet dialog box is a port number. Each time you identify a port number this tells your TReK system to watch that port for incoming packets. Specifically, it tells your TReK system that you are expecting that particular packet to arrive at that port. If you have three different Packet IDs (APIDs) arriving at that port, but you only want to process one of those Packet IDs, your TReK system will have to look at each packet that arrives at that port to determine which packets to accept and which packets to ignore. This means that your TReK system must expend additional CPU resources to look at packets that you don't really want to accept. Figure 134 shows an example of this single port configuration strategy.

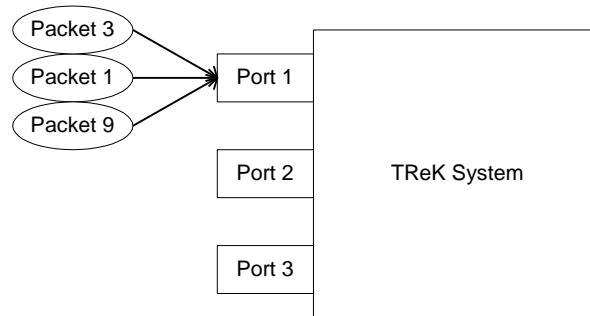


Figure 134 Single Port Configuration Strategy

This port configuration strategy shows that there will be three different packets going to a single port (port 1). This configuration minimizes TReK's memory requirements but it may not be an efficient use of your machine's CPU resources. Lets say that at one particular moment in time the POIC is sending all three packets (Packet ID 3, Packet ID 1, and Packet ID 9) to port 1, but you're only interested in accepting and processing Packet ID 1. This means Packet ID 1 is the only packet in the main window packet list that has been activated. The configuration in Figure 134 forces your TReK system to look at all the packets arriving at port 1. Your TReK system will evaluate each packet that arrives to determine whether it is Packet 1 (which it should accept) or a different packet (which it should drop). If this is a likely scenario and the aggregate data rate for all your streams is high (greater than 1 mega bit per second) then Figure 2 offers a better port configuration. In this configuration each packet is going to a different port. Therefore, when your TReK system looks at port 1 to find Packet ID 1, the only packet arriving at port 1 will be Packet 1. Your TReK system won't have to expend CPU resources weeding through any other packets arriving at port 1 to find Packet 1.

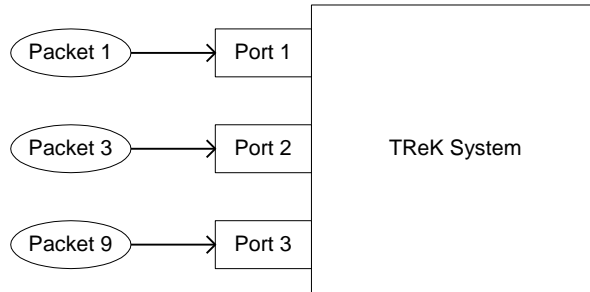


Figure 135 Multi-Port Configuration Strategy

Please be sure to consider this when you enter your packet transmission information into the Payload Data Library (PDL).

7.8 How are the Packet Statistics and Port Statistics calculated and what do they mean?

The Packet Statistics dialog contains information on how much data TReK is processing and if there are any errors identified when the packets arrive. This information is updated once every second. For each packet ID, the number of packets received and dropped by TReK is calculated. The dropped packets are actually pulled from the network, but removed from TReK's queues before TReK could process them. Each packet received by TReK is also checked for sequence errors. The sequence count in the CCSDS primary header is used to determine if a sequence error has occurred. If the packet is not the next in the sequence, the number of sequence errors will increment. The maximum packet sequence error is the maximum difference, in sequence counts, between successive packets.

The Packet Statistics dialog's Port tab contains information about each port's data rate. It also displays the number of packets that have been received and queued. The packets received on a port are the total number pulled from the network. This number could include packets that were not identified as a packet that should be processed. The packets queued are the total number of packets waiting to be processed. The data rate information is provided to give a one second snapshot of the amount of data ingested by TReK. The maximum rates indicate the highest one-second rate. Since data is sent asynchronously, the data rate will naturally fluctuate. However, you should see a data rate that is close to your expected data rate.

Statistic Generation

The statistics that can change are described below with examples where needed.

*Packet Statistics Dialog Packet Tab**Packets Received (Pkts Rcvd)*

The packets received are the total number of packets that are identified for this packet (APID, Packet Type, and Data Mode).

This statistic is available for processing, recording, forwarding and viewing. If you only have TReK process and record your data, you will have zeros in the forwarding and viewing columns for this statistic. In most cases the numbers for processing, recording, and forwarding will be the same. If they are different, it is important information that could be used in tracking a problem.

Packets Dropped

The packets dropped information is provided in the Processed Packets Dropped (Proc Pkts Drop), Record Packets Dropped (Rec Pkts Drop), Forward Packets Dropped (Fwd Pkts Drop), and View Packets Dropped (View Pkts Drop) columns. These columns indicate the number of packets dropped by processing, recording, forwarding, or viewing. These numbers indicate that the network retrieved the packets and successfully made them available for processing, recording, forwarding, or viewing, but the packet was dropped because TReK was unable to process the data fast enough. If this error occurs, it may indicate that the queue size needs to be increased. See the FAQ about TReK Queues on the TReK web site for more information.

For recording this could also indicate that a disk is filling up or is in need of defragmentation. Check the disk on which you are recording and fix these problems if they exist.

For forwarding, this could also indicate that the network is busy and the packet could not be forwarded. Possible solutions include a faster network or a computer with multiple network interfaces. Please contact the TReK Help Desk to discuss this type of problem before buying anything.

Packet Sequence Errors (Pkt Seq Err)

This indicates the total number of packet sequence errors identified for this packet. The primary header of the CCSDS packet contains a 14-bit number that is used as a sequence count. For each packet that arrives, TReK checks the sequence count and compares it to the sequence count of the previous packet. If it is not the next in sequence, the packet sequence error value is incremented. The following examples should help explain this better.

Example 1:

Packets arrive with the following sequences 0, 1, 2, 3, 4, 5, and 6. No errors are generated since the packets arrived in order.

Example 2:

Packets arrive with the following sequences 6, 7, 9, 10, and 15. Two sequence count errors are generated here: One for the jump from 7 to 9 and one for the jump from 10 to 15.

Example 3:

Packets arrive with the following sequences 15, 16, 18, 17, 19, and 20. Three sequence counter errors are generated: One for the jump from 16 to 18, one for the negative sequence of 18 to 17, and one for the jump for 17 to 19. In this example, all of the packets arrived, but three sequence errors are generated.

Example 4:

Packets arrive with the following sequences 16382, 16383, 0, and 1. No errors are generated since TReK recognizes that the sequence count must reset to 0 after 16383.

Maximum Packet Sequence Error (Max Pkts Seq Err)

This indicates the absolute value of the maximum delta between sequences that caused an error. The following examples should help explain this better.

Example 1:

Packets arrive with the following sequences 6, 7, 9, 10, and 11. The maximum sequence count error is 2 (7-9).

Example 2:

Packets arrive with the following sequences 12, 13, 15, 16, 17, 14, and 18. The maximum sequence count error is 3 (17-14).

Packet Statistics Dialog Port Tab

Segments Received (Seg Rcvd)

This indicates the total number of segments received on this port. This statistic is only applicable for ports that are receiving packets via TCP.

Segments Dropped (Seg Drop)

This indicates the number of segments dropped. This can occur when TReK is trying to process too much data or you don't have the queues sized large enough. See the FAQ on the TReK web page for more information. This statistic is only applicable for ports that are receiving packets via TCP.

Packets Received (Pkts Rcvd)

This indicates the total number of packets received on this port. This could include packets that arrived, but were not packets that TReK was configured to process.

Packets Dropped (Pkts Drop)

This indicates the number of packets dropped. This can occur when TReK is trying to process too much data or you don't have the queues sized large enough. See the FAQ on the TReK web page for more information.

Packet Receive Rate (Pkt Rcv Rate)

This indicates the number of packets arriving on the port in the last second. This value is updated every second and includes packets that may not be processed on TReK. If you know how many packets to expect each second, this number should be close. Since data is sent asynchronously the value will fluctuate around your expected number. If the packet rate is much less than you expect and you are seeing sequence errors on the packet tab, this could be caused by poor network performance.

Maximum Packet Receive Rate (Max Pkt Rcv Rate)

This indicates the maximum packet rate.

Kbit Receive Rate (Kbit Rcv Rate)

This number indicates the number of kilobits of data arriving in the last second. This value along with the packet rate can help determine how much data you are trying to process. If you know how much data to expect (e.g., 2 Mbits/sec), this number should be close (don't forget 2Mbits/sec will be displayed as 2000 Kbits/sec). Since data is sent asynchronously the value will fluctuate around your expected number. If the Kbit rate is much less than you expect and you are seeing sequence errors on the packet tab, this could be caused by poor network performance.

Maximum Kbit Receive Rate (Max Kbit Rcv Rate)

This indicates the maximum Kilobit rate of data.

Percentage of Packets Processed (% Pre Proc)

This number indicates the percentage of packets currently processed. If the packets dropped and packets queued numbers are zero and packets have been received, this value will be 100%. If no packets have been dropped, but some are in the queue this value will be slightly less than 100%.

Packets or Segments Queued (Queued)

This number indicates the number of packets or segments currently in the network queue. This number will frequently be something other than zero. If it is fluctuating, but is not increasing toward the queue limit, no problems should occur.

Packets Forwarded (Pkts Fwd)

This is only applicable to ports that are configured to forward data. This number indicates the number of packets actually forwarded from the port.

Forward Packets Dropped (Fwd Pkts Drop)

This indicates the number of forward packets dropped. This can occur when TReK is trying to forward too much data or you are experiencing poor network performance due to collisions.

Packet Forward Rate (Pkt Fwd Rate)

This indicates the number of packets forwarded on the port in the last second. This value is updated every second. If the forward packet rate is much less than you expect this could be caused by poor network performance.

Maximum Packet Forward Rate (Max Pkt Fwd Rate)

This indicates the maximum packet forward rate.

Kbit Forward Rate (Kbit Fwd Rate)

This number indicates the number of kilobits of data forwarded in the last second. If the Kbit rate is much less than you expect, this could be caused by poor network performance.

Maximum Kbit Forward Rate (Max Kbit Fwd Rate)

This indicates the maximum Kilobit forward rate of data.

Final Thoughts

If you need to record statistics information for your own use or to help track down a problem when working with the help desk, you can do this. The Packet Statistics Recording feature can be configured using the Add A Packet dialog. If you have already activated the packet, you can use the Packet Properties dialog to make this change.

8 Messages

Validation messages and error messages are listed in the Telemetry Processing On-Line Help.

Appendix A Glossary

Note: This Glossary is global to all TReK documentation. All entries listed may not be referenced within this document.

Application Programming Interface (API)	A set of functions used by an application program to provide access to a system's capabilities.
Application Process Identifier (APID)	An 11-bit field in the CCSDS primary packet header that identifies the source-destination pair for ISS packets. The type bit in the primary header tells you whether the APID is a payload or system source-destination.
Calibration	The transformation of a parameter to a desired physical unit or text state code.
Communications Outage Recorder	System that captures and stores payload science, health and status, and ancillary data during TDRSS zone of exclusion.
Consultative Committee for Space Data Systems (CCSDS) format	Data formatted in accordance with recommendations or standards of the CCSDS.
Consultative Committee for Space Data Systems (CCSDS) packet	A source packet comprised of a 6-octet CCSDS defined primary header followed by an optional secondary header and source data, which together may not exceed 65535 octets.
Conversion	Transformation of downlinked spacecraft data types to ground system platform data types.
Custom Data Packet	A packet containing a subset of parameters that can be selected by the user at the time of request.
Cyclic Display Update Mode	A continuous update of parameters for a particular display.
Decommulation (Decom)	Extraction of a parameter from telemetry.
Discrete Values	Telemetry values that have states (e.g., on or off).

Dump	During periods when communications with the spacecraft are unavailable, data is recorded onboard and played back during the next period when communications resume. This data, as it is being recorded onboard, is encoded with an onboard embedded time and is referred to as dump data.
Enhanced HOSC System (EHS)	Upgraded support capabilities of the HOSC systems to provide multi-functional support for multiple projects. It incorporates all systems required to perform data acquisition and distribution, telemetry processing, command services, database services, mission support services, and system monitor and control services.
Exception Monitoring	A background process capable of continuously monitoring selected parameters for Limit or Expected State violations. Violation notification is provided through a text message.
Expected State Sensing	Process of detecting a text state code generator in an off-nominal state.
EXPRESS	An EXPRESS Rack is a standardized payload rack system that transports, stores and supports experiments aboard the International Space Station. EXPRESS stands for EXpedite the PProcessing of Experiments to the Space Station.
File transfer protocol (ftp)	Protocol to deliver file-structured information from one host to another.
Flight ancillary data	A set of selected core system data and payload health and status data collected by the USOS Payload MDM, used by experimenters to interpret payload experiment results.

Grayed out	Refers to a menu item that has been made insensitive, which is visually shown by making the menu text gray rather than black. Items that are grayed out are not currently available.
Greenwich Mean Time (GMT)	The solar time for the meridian passing through Greenwich, England. It is used as a basis for calculating time throughout most of the world.
Ground ancillary data	A set of selected core system data and payload health and status data collected by the POIC, which is used by experimenters to interpret payload experiment results. Ground Ancillary Data can also contain computed parameters (pseudos).
Ground receipt time	Time of packet origination. The time from the IRIG-B time signal received.
Ground Support Equipment (GSE)	GSE refers to equipment that is brought in by the user (i.e. equipment that is not provided by the POIC).
Ground Support Equipment Packet	A CCSDS Packet that contains data extracted from any of the data processed by the Supporting Facility and the format of the packet is defined in the Supporting Facility's telemetry database.
Huntsville Operations Support Center (HOSC)	A facility located at the Marshall Space Flight Center (MSFC) that provides scientists and engineers the tools necessary for monitoring, commanding, and controlling various elements of space vehicle, payload, and science experiments. Support consists of real-time operations planning and analysis, inter- and intra-center ground operations coordination, facility and data system resource planning and scheduling, data systems monitor and control operations, and data flow coordination.

IMAQ ASCII	A packet type that was added to TReK to support a very specific application related to NASA's Return to Flight activities. It is not applicable to ISS. It is used to interface with an infrared camera that communicates via ASCII data.
Limit Sensing	Process of detecting caution and warning conditions for a parameter with a numerical value.
Line Outage Recorder Playback	A capability provided by White Sands Complex (WSC) to play back tapes generated at WSC during ground system communication outages.
Measurement Stimulus Identifier (MSID)	Equivalent to a parameter.
Monitoring	A parameter value is checked for sensing violations. A message is generated if the value is out of limits or out of an expected state.
Parameter	TReK uses the generic term parameter to mean any piece of data within a packet. Sometimes called a measurement or MSID in POIC terminology.
Payload Data Library (PDL)	An application that provides the interface for the user to specify which capabilities and requirements are needed to command and control his payload.
Payload Data Services Systems (PDSS)	The data distribution system for ISS. Able to route data based upon user to any of a number of destinations.
Payload Health and Status Data	Information originating at a payload that reveals the payload's operational condition, resource usage, and its safety/anomaly conditions that could result in damage to the payload, its environment or the crew.
Payload Operations Integration Center (POIC)	Manages the execution of on-orbit ISS payloads and payload support systems in coordination/unison with distributed International Partner Payload Control Centers, Telescience Support Centers (TSC's) and payload-unique remote facilities.

Payload Rack Checkout Unit (PRCU)	The Payload Rack Checkout Unit is used to verify payload to International Space Station interfaces for U.S. Payloads.
Playback	Data retrieved from some recording medium and transmitted to one or more users.
Pseudo Telemetry (pseudo data)	Values that are created from calculations instead of directly transported telemetry data. This pseudo data can be created from computations or scripts and can be displayed on the local PC.
Remotely Generated Command	A command sent by a remote user whose content is in a raw bit pattern format. The commands differ from predefined or modifiable commands in that the content is not stored in the POIC Project Command Database (PCDB).
Science data	Sensor or computational data generated by payloads for the purpose of conducting scientific experiments.
Subset	A collection of parameters from the total parameter set that is bounded as an integer number of octets but does not constitute the packet itself. A mini-packet.
Super sampled	A parameter is super sampled if it occurs more than once in a packet.
Swap Type	A flag in the Parameter Table of the TReK database that indicates if the specified datatype is byte swapped (B), word swapped (W), byte and word swapped (X), byte reversal (R), word reversal (V) or has no swapping (N).
Switching	A parameter's value can be used to switch between different calibration and sensing sets. There are two types of switching on TReK: range and state code.

Transmission Control Protocol (TCP)	TCP is a connection-oriented protocol that guarantees delivery of data.
Transmission Control Protocol (TCP) Client	A TCP Client initiates the TCP connection to connect to the other party.
Transmission Control Protocol (TCP) Server	A TCP Server waits for (and accepts connections from) the other party.
Telemetry	Transmission of data collected from a source in space to a ground support facility. Telemetry is downlink only.
Telescience Support Center (TSC)	A TSC is a NASA funded facility that provides the capability to plan and operate on-orbit facility class payloads and experiments, other payloads and experiments, and instruments.
User Application	Any end-user developed software program that uses the TREK Application Programming Interface software. Used synonymously with User Product.
User Data Summary Message (UDSM)	Packet type sent by PDSS that contains information on the number of packets sent during a given time frame for a PDSS Payload packet. For details on UDSM packets, see the POIC to Generic User IDD (SSP-50305).
Uplink format	The bit pattern of the command or file uplinked.
User Datagram Protocol (UDP)	UDP is a connection-less oriented protocol that does not guarantee delivery of data. In the TCP/IP protocol suite, the UDP provides the primary mechanism that application programs use to send datagrams to other application programs. In addition to the data sent, each UDP message contains both a destination port number and a fully qualified source and destination addresses making it possible for the UDP software on the destination to deliver the message to the correct recipient process and for the recipient process to send a reply.

User Product	Any end-user developed software program that uses the TReK Application Programming Interface software. Used synonymously with User Application.
Web	Term used to indicate access via HTTP protocol; also referred to as the World Wide Web (WWW).

Appendix B Acronyms

Note: This acronym list is global to all TReK documentation. Some acronyms listed may not be referenced within this document.

AOS	Acquisition of Signal
API	Application Programming Interface
APID	Application Process Identifier
ASCII	American Standard Code for Information Interchange
CAR	Command Acceptance Response
CAR1	First Command Acceptance Response
CAR2	Second Command Acceptance Response
CCSDS	Consultative Committee for Space Data Systems
CDB	Command Database
CDP	Custom Data Packet
COR	Communication Outage Recorder
COTS	Commercial-off-the-shelf
CRR	Command Reaction Response
DSM	Data Storage Manager
EHS	Enhanced Huntsville Operations Support Center (HOSC)
ERIS	EHS Remote Interface System
ERR	EHS Receipt Response
EXPRESS	Expediting the Process of Experiments to the Space Station
ES	Expected State
FAQ	Frequently Asked Question
FDP	Functionally Distributed Processor
FSV	Flight System Verifier
FSV1	First Flight System Verifier
FSV2	Second Flight System Verifier
FPD	Flight Projects Directorate
FTP	File Transfer Protocol
GMT	Greenwich Mean Time
GRT	Ground Receipt Time
GSE	Ground Support Equipment
HOSC	Huntsville Operations Support Center
ICD	Interface Control Document
IMAQ ASCII	Image Acquisition ASCII
IP	Internet Protocol
ISS	International Space Station
LDP	Logical Data Path
LES	Limit/Expected State
LOR	Line Outage Recorder
LOS	Loss of Signal
MCC-H	Mission Control Center – Houston
MOP	Mission, Operational Support Mode, and Project
MSFC	Marshall Space Flight Center

MSID	Measurement Stimulus Identifier
NASA	National Aeronautics and Space Administration
OCDB	Operational Command Database
OS	Operating System
PC	Personal Computer, also Polynomial Coefficient
PCDB	POIC Project Command Database
PDL	Payload Data Library
PDSS	Payload Data Services System
PGUIDD	POIC to Generic User Interface Definition Document
POIC	Payload Operations Integration Center
PP	Point Pair
PRCU	Payload Rack Checkout Unit
PSIV	Payload Software Integration and Verification
RPSM	Retrieval Processing Summary Message
SC	State Code
SCS	Suitcase Simulator
SSP	Space Station Program
SSCC	Space Station Control Center
SSPF	Space Station Processing Facility
TCP	Transmission Control Protocol
TReK	Telescience Resource Kit
TRR	TReK Receipt Response
TSC	Telescience Support Center
UDP	User Datagram Protocol
UDSM	User Data Summary Message
URL	Uniform Resource Locator
USOS	United States On-Orbit Segment
VCDU	Virtual Channel Data Unit
VCR	Video Cassette Recorder
VPN	Virtual Private Network

Appendix C File Format for CDP Parameters Input File Example

```
//
// Anything on a line after a double slash is ignored.
//

//
// Format is Parameter Name,Number of Samples,Processing,Sensing
//
// Valid Values are (no case compares)
//   Number of Samples - A, All, F, First
//   Processing - UN, Unprocessed, CO, Converted, CA, Calibrated
//   Sensing - S, Sense, N, No Sense
//

MSID001,A,UN,N
MSID002,A,S      // Too few fields, line will be ignored
MSID003,F,CA,S
MSID004,First,Converted,Sense
MSID005,,,      // Incorrect data in fields, line will be ignored
MSID006,A,UN,S,Last // Too many fields, line will be ignored
MSID007,A,CA,N
```